

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT6617036

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
VIAGAN	02/11/2020
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	LED WAFER SOLUTIONS LLC
<b>Street Address:</b>	7215 BOSQUE BLVD, SUITE 156
<b>City:</b>	WACO
<b>State/Country:</b>	TEXAS
<b>Postal Code:</b>	76710
<b>PROPERTY NUMBERS Total: 7</b>	
<b>Property Type</b>	<b>Number</b>
Patent Number:	9406854
Patent Number:	9502612
Patent Number:	8952405
Patent Number:	9837583
Patent Number:	8941137
Patent Number:	9786822
Application Number:	15188225
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
<b>Email:</b>	bliddle@carterarnett.com
<b>Correspondent Name:</b>	BRADLEY LIDDLE
<b>Address Line 1:</b>	8150 N. CENTRAL EXPRESSWAY, SUITE 500
<b>Address Line 4:</b>	DALLAS, TEXAS 75206
<b>NAME OF SUBMITTER:</b>	BRADLEY LIDDLE
<b>SIGNATURE:</b>	/s/ Bradley Liddle
<b>DATE SIGNED:</b>	03/23/2021
	This document serves as an Oath/Declaration (37 CFR 1.63).
<b>Total Attachments: 1</b>	



## ASSIGNMENT

Pursuant to the Agreement of February 11, 2020, this Assignment ("Assignment") is made by and between ViaGaN, an Israeli company ("VGN"), and LED Wafer Solutions LLC, a Delaware company ("LWS"),

WHEREAS, VGN owns, all right, title and interest in, to and under U.S. Patent Nos. 9,406,854; 9,502,612; 8,952,405; 9,837,583; 8,941,137; and 9,786,822, and VGN wishes to transfer the above patent rights, as well as any related United States or foreign patents or patent applications, including without limitation, U.S. Patent Application No. 15/188,225 and Chinese Patent Nos. ZL201080041485.9, ZL201210057427.6, CN ZL201210057611.0; any foreign counterparts, continuations, divisions, continuations-in-part, reissues, reexaminations, or any other applications or patents claiming priority to any patent and/or patent application above (the "PATENTS");

WHEREAS, VGN has agreed to assign all right, title, and interest in, to and under the PATENTS to LWS;

NOW, THEREFORE, for other good and valuable consideration, the receipt of which is hereby acknowledged:

Effective February 24, 2020, VGN hereby conveys, assigns, transfers, and sets over to LWS, VGN's entire right, title, and interest in, to, and under the PATENTS, and all patents, patent applications, foreign patents, foreign patent applications, continuations, continuations-in-part, divisionals, extensions, renewals, reissues and re-examinations related to the PATENTS, including without limitation, all rights to claim priority on the basis thereof, all rights to sue for past, present and future infringement, including the right to collect and receive any damages, royalties, or settlements for such infringements, all rights to sue for injunctive or other equitable relief, and any and all causes of action relating to any of the inventions or discoveries thereof.

IN WITNESS WHEREOF, VGN has caused this Assignment to be executed on February 24, 2020.

**ViaGaN**

Moti Margalit  
Signature

Mordehai Margalit  
Print Name

CEO  
Title



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	11/22/2016	9502612	VIA.USCIP.0110	6858

93255 7590 11/02/2016  
Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham, MA 02451

### ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

#### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordechai Margalit	VIA.USCIP.0110	6858
93255	7590	10/12/2016		
Intrinsic Law Corp. 760 Main Street Third Floor Waltham, MA 02451			EXAMINER ZARNEKE, DAVID A	
			ART UNIT 2891	PAPER NUMBER
			MAIL DATE 10/12/2016	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Corrected Notice of Allowability</b>	<b>Application No.</b> 14/047,715	<b>Applicant(s)</b> MARGALIT, MORDEHAI	
	<b>Examiner</b> David Zarneke	<b>Art Unit</b> 2891	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to \_\_\_\_\_.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 2-10 and 21-23. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to PPHfeedback@uspto.gov.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☒ All    b) ☐ Some    \*c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 13/424,875.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> <li>4. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____</li> </ol> | <ol style="list-style-type: none"> <li>5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>7. <input type="checkbox"/> Other _____</li> </ol> |
|---|---|

/David Zarneke/  
Primary Examiner, Art Unit 2891  
10/7/16

### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows: Change the dependency of claims 3, 5-7, and 10 from "1" to --21--.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Zarneke whose telephone number is (571)272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571)-272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Zarneke/  
Primary Examiner, Art Unit 2891  
10/7/16





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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/047,715	10/07/2013	2891	800	VIA.USCIP.0110	20	2

**CONFIRMATION NO. 6858**

**CORRECTED FILING RECEIPT**



0000000088089777

93255

Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham, MA 02451

Date Mailed: 09/27/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

**Applicant(s)**

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

**Power of Attorney:** None

**Domestic Priority data as claimed by applicant**

This application is a CIP of 13/424,875 03/20/2012 PAT 9406854  
which is a CIP of PCT/IL2010/000772 09/20/2010  
which claims benefit of 61/244,046 09/20/2009  
and claims benefit of 61/351,875 06/05/2010  
This application 14/047,715  
claims benefit of 61/710,156 10/05/2012

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*

**Permission to Access Application via Priority Document Exchange:** No

**Permission to Access Search Results:** No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 11/06/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/047,715**

**Projected Publication Date:** 01/05/2017

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

Light Emitting Diode Package with Enhanced Heat Conduction

**Preliminary Class**

257

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

**LICENSE FOR FOREIGN FILING UNDER**  
**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/047,715	10/07/2013	Mordehai Margalit	VIA.USCIP.0110

**CONFIRMATION NO. 6858**

**PUB REQUEST ACCEPTANCE  
LETTER**



93255  
Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham, MA 02451

Date Mailed: 09/16/2016

**NOTICE OF ACCEPTANCE OF PUBLICATION REQUEST**

The request for voluntary publication, amended publication, early publication, redacted publication, republication, corrected publication or revised publication has been received for this application. The request, including payment of any necessary fee(s), is in compliance with 37 CFR 1.215, 1.217, 1.219 or 1.221.

The projected publication date is 12/29/2016.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/dterry/



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/047,715	10/07/2013	2891	800	VIA.USCIP.0110	20	2

**CONFIRMATION NO. 6858**

**CORRECTED FILING RECEIPT**



0000000085782330

93255

Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham, MA 02451

Date Mailed: 09/14/2016

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**Inventor(s)**

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

**Applicant(s)**

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

**Power of Attorney:** None

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ISRAEL PCT/IL2010/000772 09/20/2010

**Permission to Access Application via Priority Document Exchange:** No

**Permission to Access Search Results:** No

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**Projected Publication Date:** Not Applicable

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

Light Emitting Diode Package with Enhanced Heat Conduction

**Preliminary Class**

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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***SelectUSA***

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
www.uspto.gov

Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham MA 02451

MAILED

SEP 14 2016

INTERNATIONAL PATENT LEGAL ADM.

In re Application of  
Mordehai MARGALIT  
Application No.: 14/047,715  
Filing Date: 07 October 2013  
Attorney Docket No.: VIA.USCIP.0110

:  
:  
:  
DECISION ON PETITION  
:  
UNDER 37 CFR 1.78(c)  
:  
AND 1.78(e)  
:

This is a decision on the petition under 37 CFR 1.78(c) and (e), filed 31 May 2016, to accept an unintentionally delayed claim under 35 U.S.C. 119(e) and 120 for the benefit of priority to one or more prior-filed provisional and nonprovisional/international applications. Further, this is also a decision on the petition under 37 CFR 1.182 to expedite consideration of the petition to accept an unintentionally delayed claim under 35 U.S.C. §119 and §120 filed on even date.

The petition under 37 CFR 1.182 is **GRANTED**.

Under 37 CFR 1.78(c) and (e), a petition to accept an unintentionally delayed claim under 35 U.S.C. 119(e) and 120 for the benefit of a prior-filed application must be accompanied by:

- (i) the reference required by 35 U.S.C. 119(e) and 120 and 37 CFR 1.78(a)(3) and 1.78(d)(2) to the prior-filed applications, unless previously submitted;
- (ii) the petition fee set forth in 37 CFR 1.17(m); and
- (iii) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

With regard to item (i), a proper reference to the prior-filed applications has been included in an application data sheet as required by 37 CFR 1.78(a)(3) and (d)(2).

With regard to item (ii), the petition fee set forth in 37 CFR 1.17(m) has been submitted.



With regard to item (iii), the statement of unintentional delay contained in the petition differs slightly from the language contained in 37 CFR 1.78(c)(3) and (e)(3) and is hereby construed as a statement that the entire delay between the date the claim was due under 1.78(a)(4) and (d)(3) and the date the claim was filed was unintentional. If this interpretation is incorrect, applicant is required to immediately notify the Office. As construed, the provided statement of unintentional delay is acceptable.

For the reasons above, the petition under 37 CFR 1.78(c) and (e) is **GRANTED**.

Applicant is advised that the inclusion of a prior-filed application on any filing receipt should not be construed as meaning that the present application is necessarily entitled to the benefit of the prior-filed application. In order for an application to be entitled to the benefit of the prior-filed application, all other requirements under 35 U.S.C. 119(e) and 120 and 37 CFR 1.78 must be met.

This matter is being referred to the Office of Publications for appropriate action.

*/BethAnne Dayoan/*

BethAnne Dayoan  
PCT Legal Examiner

International Patent Legal Administration  
571-272-3209

ATTACHMENT: corrected filing receipt

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Intrinsic Law Corp.  
760 Main St., Third Floor  
Waltham, MA 02451

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Ibrahim M. Hallaj	(Depositor's name)
/Ibrahim M. Hallaj/	(Signature)
2016-07-12	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	2013-10-07	Mordehai Margalit	VIA.USCIP.0110	6858

TITLE OF INVENTION:

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$480	\$0	\$0	\$480	2016-07-12

EXAMINER	ART UNIT	CLASS-SUBCLASS

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev. 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,</p> <p>(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.</p> <p>1 Intrinsic Law Corp.</p> <p>2 Ibrahim M. Hallaj</p> <p>3</p>
--	---

## **3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

Viagan Ltd.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Zichron Yaakov, Israel

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

## **4a. The following fee(s) are submitted:**

☒ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies \_\_\_\_\_

## **4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☒ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 505153 (enclose an extra copy of this form).

## **5. Change in Entity Status (from status indicated above)**

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Ibrahim M. Hallaj/

Date 2016-07-12

Typed or printed name Ibrahim M. Hallaj

Registration No. 51768

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		14047715		
<b>Filing Date:</b>		07-Oct-2013		
<b>Title of Invention:</b>		Light Emitting Diode Package with Enhanced Heat Conduction		
<b>First Named Inventor/Applicant Name:</b>		Mordehai Margalit		
<b>Filer:</b>		Ibrahim M. Hallaj/Jessica Lecesce		
<b>Attorney Docket Number:</b>		VIA.USCIP.0110		
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl Issue Fee	2501	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				480

<b>Electronic Acknowledgement Receipt</b>	
<b>EFS ID:</b>	26326205
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	12-JUL-2016
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	15:24:24
<b>Application Type:</b>	Utility under 35 USC 111(a)

### **Payment information:**

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$480
RAM confirmation Number	071316INTEFSW15252300
Deposit Account	8086
Authorized User	Ibrahim Hallaj
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

<b>File Listing:</b>					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	VIA_USCIP_0110_ptol85b.pdf	74896	no	2
			bfea755d67515c68e1f4a6a6e5c9f839b48d1308		
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30448	no	2
			0cc02906a87d35c255bac21668154318d7d4287d		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			105344		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	October 7, 2013
Examiner	David A. Zarneke
Art Unit	2891
For	Light Emitting Diode Package with Enhanced Heat Conduction
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

May 31, 2016

Mail Stop Petitions  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**PETITION TO CORRECT UNINTENTIONALLY DELAYED CLAIM FOR THE  
BENEFIT OF PRIORITY UNDER 37 CFR §1.78**

Applicants hereby petition to enter in the above-captioned patent application an unintentionally delayed claim for the benefit of priority of earlier filed applications. Pursuant to 37 CFR §1.78, Applicants concurrently submit herewith:

- Corrected Application Data Sheet;
- The fee required under 37 CFR §1.17(m); and
- Applicant's statement, beginning on page 3.

Upon acceptance of this petition, Applicants respectfully request that the USPTO records be promptly updated.



Should any official at the USPTO deem that any further action by the Applicant or the Applicant's undersigned attorney is desirable and/or necessary, the official is invited to contact the undersigned at phone number set forth below.

If any further fees are required in this matter that have not been paid along with this Response, the Office is kindly requested and authorized to charge such fees to Applicants' attorney's USPTO Deposit Account No. 50-5153.

Respectfully submitted,

/Ibrahim M. Hallaj/

Ibrahim M. Hallaj, Esq.  
Reg. No. 51,768  
Customer No. 93255  
Intrinsic Law Corp.  
760 Main Street, Third Floor  
Waltham, MA 02451  
617.420.0079  
docketing@intrinsiclaw.com

**APPLICANT'S STATEMENT**

The facts in this case are not an omitted claim of priority, but relate to the vehicle through which the priority is stated, and which was acknowledged by the USPTO. Applicant stated his claim of priority in multiple places, as described below, which reveal that both Applicant and the USPTO might have helped avoid the need for the present Petition. Examiner D. Zarneke has stated to Applicant in advance of filing this petition that the Examiner/TC have no objections to the granting of this Petition.

The relevant facts are:

1. Applicant stated its claim of priority in good faith in the originally filed application (post-AIA) including in two places:
  - a. in an Application Data Sheet (ADS) submitted with the application on 10/7/2013;
  - b. at the beginning of Applicant's specification in the "Related Applications" section, submitted on 10/7/2013, identifying each of the following related priority documents:
2. In each of the above submissions, Applicant identified the following priority documents, which were acknowledged in part (e.g., in the Filing Receipt, mailed 11/7/2013):
  - a. PCT/IL2010/000772 (filed 09/20/2010), which is acknowledged in the original Filing Receipt (mailed 11/7/2013); Also on publication No. US 2014/0042479;

- b. Parent US application No. 13/424,875, which is acknowledged in the original Filing Receipt (mailed 11/7/2013); Also on publication No. US 2014/0042479;
- c. US Provisional No. 61/710,156, which is acknowledged in the original Filing Receipt (mailed 11/7/2013); Also on publication No. US 2014/0042479;
- d. US Provisional No. 61/244,046 (filed 9/20/2009); and
- e. US Provisional No. 61/351,875 (filed 6/5/2010).

Applicant submits that as stated, his application set forth the above priority claims, albeit a clerical error was noted by the USPTO after allowance of this application resulting from the mis-identification of the relationship of the parent of the present application (Ser. No. 13/424,875) and that application's priority documents. The USPTO for its part was supposed to review the priority claims at the time of the application but proceeded to acknowledge and list and publish the Applicant's priority claims despite the above clerical error. The Applicant was not informed of the objection to his priority claims according to MPEP 214.03 or the suggested form paragraph. For further clarification, it may be helpful to also review Applicant's co-pending petition in said parent case (13/424,875), filed on May 27, 2016.

Therefore,

Applicant hereby respectfully petitions to obtain proper priority to its prior-filed PCT and provisional applications, above, which was acknowledge in part and refused in part as brought to Applicant's attention in the latter part of the present prosecution (after allowance). Applicant has not paid the issue fee

for this application at the time of this submission, and submits herewith a Petition to Expedite in view of that time frame. A corrected ADS is also submitted herewith.

To the extent Applicant delayed the request for priority claim, the entire delay between the filing of the aforementioned patent application and the present claim for the benefit of priority was unintentional.

Applicant respectfully requests the expedited granting of his Petition.

Respectfully submitted,

/Ibrahim M. Hallaj/

Ibrahim M. Hallaj, Esq.  
Reg. No. 51,768  
Customer No. 93255  
Intrinsic Law Corp.  
760 Main Street, Third Floor  
Waltham, MA 02451  
617.420.0079  
docketing@intrinsiclaw.com

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

**Secrecy Order 37 CFR 5.2**

☐ Portions of all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

**Inventor Information:**

Inventor 1 <span style="float: right;">Remove</span>				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Mordehai		Margalit	
Residence Information (Select One) <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	Zichron Yaakov	Country of Residence <sup>1</sup>	IL	
Mailing Address of Inventor:				
Address 1		21 Hashita St.		
Address 2				
City	Zichron Yaakov	State/Province		
Postal Code	30900	Country <sup>1</sup>	IL	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. <span style="float: right;">Add</span>				

**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).		
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.		
Customer Number	93255	
Email Address	docketing@intrinsicl.com	<span>Add Email</span> <span>Remove Email</span>

**Application Information:**

Title of the Invention	Light Emitting Diode Package with Enhanced Heat Conduction		
Attorney Docket Number	OCT.USCIP.0110	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	12	Suggested Figure for Publication (if any)	12

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		

**Publication Information:**
☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative information during processing.

Please Select One: ☒ Customer Number ☐ US Patent Practitioner ☐ Limited Recognition (37 CFR 11.9)

Customer Number 93255

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14/047715	Continuation in part of	13424875	2012-03-20
Prior Application Status	Pending	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14/047715	non provisional of	61710156	2012-10-05
Prior Application Status	Expired	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
13/424875	continuation-in-part	PCT/IL10/06772	2009-09-20 2010-09-20
Prior Application Status	Expired	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/IL10/06772	non provisional of	61351875	2010-06-05
Prior Application Status		<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/IL10/06772	claims benefit of	61244046	2009-09-20

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

### Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX), the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

<a href="#">Remove</a>			
Application Number	Country <sup>1</sup>	Filing Date (YYYY-MM-DD)	Access Code <sup>2</sup> (if applicable)
PCT/IL2010/000772	WO	2010-09-20	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

### Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

☐ **NOTE:** By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

### Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
<b>Applicant 1</b>				
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.				
<input type="button" value="Clear"/>				
<input type="radio"/> Assignee		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Joint Inventor
<input type="radio"/> Person to whom the inventor is obligated to assign.		<input type="radio"/> Person who shows sufficient proprietary interest.		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>				
If the Applicant is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		
<b>Mailing Address Information For Applicant:</b>			
Address 1			
Address 2			
City		State/Province	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

**Assignee Information including Non-Applicant Assignee Information:**

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

<b>Assignee 1</b>				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
<b>Mailing Address Information For Non-Applicant Assignee:</b>				
Address 1				
Address 2				
City		State/Province		
Country		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Packages with Enhanced Heat Conduction		

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	<del>Ibrahim M. Hallaj</del> <i>Ibrahim M. Hallaj</i>		Date (YYYY-MM-DD)	<del>2010-10-07</del> <i>2010-05-31</i>	
First Name	Ibrahim M.	Last Name	Hallaj	Registration Number	51768
Additional Signature may be generated within this form by selecting the Add button.					

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		14047715		
<b>Filing Date:</b>		07-Oct-2013		
<b>Title of Invention:</b>		Light Emitting Diode Package with Enhanced Heat Conduction		
<b>First Named Inventor/Applicant Name:</b>		Mordehai Margalit		
<b>Filer:</b>		Ibrahim M. Hallaj/Jessica Lecesse		
<b>Attorney Docket Number:</b>		VIA.USCIP.0110		
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
Pet. Delay Sub or Restore Priority-Claim	2454	1	850	850
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				850

Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	25927825
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	31-MAY-2016
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	17:17:11
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$850
RAM confirmation Number	4816
Deposit Account	505153
Authorized User	HALLAJ, IBRAHIM M
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	VIA_USCIP_0110_Petition.pdf	55857 e2a81f2eb1f79ab272ba2c1e1c069edfc2a39592	no	5

### Warnings:

### Information:

2	Application Data Sheet	VIA_USCIP_0110_Corrected_A DS.pdf	1152370 612a50bfc35a4fc1dcd2373ad8ca5e91798c6d5b	no	6
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### Warnings:

### Information:

This is not an USPTO supplied ADS fillable form

3	Fee Worksheet (SB06)	fee-info.pdf	30398 3751e0b6f60c251c405536f42d4e4e0a5465516e	no	2
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### Warnings:

### Information:

<b>Total Files Size (in bytes):</b>	1238625
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

### New Applications Under 35 U.S.C. 111

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

### National Stage of an International Application under 35 U.S.C. 371

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

### New International Application Filed with the USPTO as a Receiving Office

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	October 7, 2013
Examiner	David A. Zarneke
Art Unit	2891
For	Light Emitting Diode Package with Enhanced Heat Conduction
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

May 31, 2016

Mail Stop Petitions  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**PETITION TO EXPEDITE UNDER 37 CFR §1.182**

Applicants hereby petition to expedite under 37 CFR §1.182 to enter in the above-referenced patent application in order to expedite the Petition to correct unintentionally delayed claim for the benefit of priority of earlier filed applications, and Corrected ADS, filed on even date herewith. Applicants concurrently submit herewith the required fee.

Upon acceptance of this petition, Applicants respectfully request that the USPTO records be promptly updated.

Should any official at the USPTO deem that any further action by the Applicant or the Applicant's undersigned attorney is desirable and/or necessary,

the official is invited to contact the undersigned at phone number set forth below.

If any further fees are required in this matter that have not been paid along with this Response, the Office is kindly requested and authorized to charge such fees to Applicants' attorney's USPTO Deposit Account No. 50-5153.

Respectfully submitted,

/Ibrahim M. Hallaj/

Ibrahim M. Hallaj, Esq.  
Reg. No. 51,768  
Customer No. 93255  
Intrinsic Law Corp.  
760 Main Street, Third Floor  
Waltham, MA 02451  
617.420.0079  
docketing@intrinsiclaw.com



Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		14047715		
<b>Filing Date:</b>		07-Oct-2013		
<b>Title of Invention:</b>		Light Emitting Diode Package with Enhanced Heat Conduction		
<b>First Named Inventor/Applicant Name:</b>		Mordehai Margalit		
<b>Filer:</b>		Ibrahim M. Hallaj/Jessica Lecesse		
<b>Attorney Docket Number:</b>		VIA.USCIP.0110		
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
Petition Fee - 37 CFR 1.17(F)(Group I)	2462	1	200	200
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				200

<b>Electronic Acknowledgement Receipt</b>	
<b>EFS ID:</b>	25927918
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	31-MAY-2016
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	17:20:39
<b>Application Type:</b>	Utility under 35 USC 111(a)

### **Payment information:**

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$200
RAM confirmation Number	4893
Deposit Account	505153
Authorized User	HALLAJ, IBRAHIM M
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	VIA_USCIP_0110_Petition_to_Expedite.pdf	42007	no	2
			8e25eb3e1d2fbce1177554a224f6e3e2989c16f9		

### Warnings:

### Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30584	no	2
			813afe4715fb2fb1c22bb421da58e42d874c98f5		

### Warnings:

### Information:

<b>Total Files Size (in bytes):</b>	72591
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

### New Applications Under 35 U.S.C. 111

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

### National Stage of an International Application under 35 U.S.C. 371

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

### New International Application Filed with the USPTO as a Receiving Office

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

## NOTICE OF ALLOWANCE AND FEE(S) DUE

93255 7590  
Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham, MA 02451

04/12/2016

EXAMINER

ZARNEKE, DAVID A

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 04/12/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordehai Margalit	VIA.USCIP.0110	6858

TITLE OF INVENTION: Light Emitting Diode Package with Enhanced Heat Conduction

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	07/12/2016

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

## PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

93255 7590 04/12/2016  
Intrinsic Law Corp.  
760 Main Street  
Third Floor  
Waltham, MA 02451

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

### Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordehai Margalit	VIA.USCIP.0110	6858

TITLE OF INVENTION: Light Emitting Diode Package with Enhanced Heat Conduction

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	07/12/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
ZARNEKE, DAVID A	2891	257-774000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

**NOTE:** This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordehai Margalit	VIA.USCIP.0110	6858
93255	7590	04/12/2016	EXAMINER	
Intrinsic Law Corp. 760 Main Street Third Floor Waltham, MA 02451			ZARNEKE, DAVID A	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 04/12/2016

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



<b>Notice of Allowability</b>	<b>Application No.</b> 14/047,715	<b>Applicant(s)</b> MARGALIT, MORDEHAI	
	<b>Examiner</b> David Zarneke	<b>Art Unit</b> 2891	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 12/18/16.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 2-10 and 21-23. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☒ All    b) ☐ Some    \*c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 13/424,875.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                  |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 7. <input type="checkbox"/> Other _____.   |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.                     |  |

/David Zarneke/  
Primary Examiner, Art Unit 2891  
3/23/16

### **DETAILED ACTION**

The present application is being examined under the pre-AIA first to invent provisions.

#### ***Examiner's Amendment***

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ibrahim Hallaj on 3/23/16.

The application has been amended as follows: cancel claims 11-16, 18 and 20.

#### ***Reasons for Allowance***

The following is an examiner's statement of reasons for allowance: prior art could not be located that taught a light emitting device comprising a carrier wafer disposed on the thermally conductive layer; at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED; and a substantially optically transmissive layer disposed proximal to the second substrate surface, wherein the carrier wafer and the thermally conductive layer define a relief to expose at least a portion of the second LED surface.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Zarneke whose telephone number is (571)272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571)-272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 14/047,715  
Art Unit: 2891

Page 4

/David Zarneke/  
Primary Examiner, Art Unit 2891  
3/23/16

<b>Notice of References Cited</b>	Application/Control No. 14/047,715	Applicant(s)/Patent Under Reexamination MARGALIT, MORDEHAI	
	Examiner David Zarneke	Art Unit 2891	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2010/0025718 A1	02-2010	Shi; Wei	H01L33/483	257/99
*	B	US-2006/0097276 A1	05-2006	Chen; Jeffrey	H01L33/62	257/99
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				


**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Search Notes</b>  	<b>Application/Control No.</b>  14047715	<b>Applicant(s)/Patent Under Reexamination</b>  MARGALIT, MORDEHAI
	<b>Examiner</b>  DAVID ZARNEKE	<b>Art Unit</b>  2891

CPC- SEARCHED		
Symbol	Date	Examiner
H01L 33/64,644,641,642,644,645,647,648, 483,486; 2933/0033,0075,64,644, H01L33/48,483,62	9/29/15	daz
	9/22/163	DAZ

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
257	98,99	9/29/15	daz

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search - see history	9/29/15	daz
	3/22/16	daz

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
H01L	33/48,483,62	3/22/16	daz

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## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	5221	h01133/48,483.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/22 16:14
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S4	1	(11/029387).APP.	USPAT; USOCR	OR	ON	2016/03/22 17:43
S5	3	("6936855").PN. OR ("7629188").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/03/22 17:43
S6	19	((("20060278885") or ("20120223351") or ("2011033516") or ("20060092532") or ("20100068421") or ("20060163683") or ("20100309382"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/03/22 17:59
S7	19	((("20060278885") or ("20120223351") or ("2011033516") or ("20060092532") or ("20100068421") or ("20060163683") or ("20110309382"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/03/22 18:00
S8	6	((("20100025718") or ("20060097276"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/03/22 18:06
S9	20754	h01133/62.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2016/03/22 18:56

## EAST Search History

			DERWENT; IBM_TDB			
S10	20742	S9 not (S2 S3 S4 S5 S6 S7 S8)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/22 18:56

## EAST Search History (Interference)

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L1	3033	h01I33/62.cpc.	USPAT	OR	ON	2016/03/23 01:27
L2	743	h01I33/48,483.cpc.	USPAT	OR	ON	2016/03/23 01:48
L3	2765	1 NOT 2	USPAT	OR	ON	2016/03/23 01:48

3/ 23/ 2016 1:49:09 AM



## EAST Search History

## EAST Search History (Prior Art)

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S4	1	"20110006322".pn. and "40"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 01:20
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			USPAT; USOCR			01:35
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S12	686	h0112933/0033.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 01:37
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S15	1076	h01133/64,644.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 02:08
S16	0	(11/396383).APP.	USPAT; USOCR	OR	ON	2015/09/29 03:45
S17	10	("2007/0228386").URPN.	USPAT	OR	ON	2015/09/29 03:45
S18	1	(11/086186).APP.	USPAT; USOCR	OR	ON	2015/09/29 03:47
S19	19	("20050035363"   "4797715"   "5879572"   "6498355"   "6507049"   "6531328"   "6599768").PN. OR ("7411225").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 03:48
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S31	686	h01I2933/0033.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 09:30
S32	5004	h01I33/483,486.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 09:30
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S34	1076	h01I33/64,644.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 09:30
S35	0	(11/396383).APP.	USPAT; USOCR	OR	ON	2015/09/29 09:30
S36	10	("2007/0228386").URPN.	USPAT	OR	ON	2015/09/29 09:30
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S40	4719247	led or emit\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 09:31
S41	193	S39 and S40	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 09:31
S42	0	(13/424875).APP.	USPAT; USOCR	OR	ON	2015/09/29 09:32
S43	0	("2012/0261697").URPN.	USPAT	OR	ON	2015/09/29 09:33
S44	11	((("6856023") or ("7951625") or ("8278213") or ("20090108283") or ("7232754"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/29 09:34
S45	11674	257/98.ccls. not (S33 S21 S23 S24 S25 S26 S31 S34 S36 S37 S38 S39 S41 S44)	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 10:02
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S47	9601	S45 and S46	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 10:03
S48	39	((("20080067534") or ("20130049564") or ("20130294471") or ("20110006322") or ("8044412") or ("4797715") or ("20140110728") or ("20090262516") or ("20070228386") or ("20070029570") or ("20060208271") or ("20140103798") or ("20130105978") or ("20120034716"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/29 10:34
S49	39	((("20080067534") or ("20130049564") or ("20130294471") or ("20110006322") or ("8044412") or ("4797715") or ("20140110728") or ("20090262516") or ("20070228386") or ("20070029570") or ("20060208271") or ("20140103798") or ("20130105978") or ("20120034716"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/29 13:27
S50	23	S49 and reflect\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 13:27
S51	5562933	optical\$3	US-PGPUB;	OR	ON	2015/09/29

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			13:29
S52	14	S50 and "3"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 13:29
S53	11	S50 and S51	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 13:29
S54	2712874	adhesive	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 13:38
S55	8	S53 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 13:38
S56	0	S53 and "65" not S55	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 14:04
S57	3	S53 not S55	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 14:04
S58	311826	"20090262516".pn. adn quantum	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 15:22
S59	0	"20090262516".pn. and quantum	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/09/29 15:22


					IBM_TDB			
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**EAST Search History (I nterference)**

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**9/ 29/ 2015 5:35:02 PM**

**C:\ Users\ dzarneke\ Documents\ EAST\ Workspaces\ 14047715.wsp**

<b>Issue Classification</b> 	<b>Application/Control No.</b> 14047715	<b>Applicant(s)/Patent Under Reexamination</b> MARGALIT, MORDEHAI	
	<b>Examiner</b> DAVID ZARNEKE	<b>Art Unit</b> 2891	


CPC						
Symbol					Type	Version
H01L		33		10	F	2013-01-01
H01L		33	/	52	A	2013-01-01
H01L		33	/	483	A	2013-01-01
H01L		33	/	48	A	2013-01-01
H01L		33	/	382	I	2013-01-01
H01L		33	/	486	I	2013-01-01
H01L		33	/	62	I	2013-01-01
H01L		2933	/	0066	A	2013-01-01
H01L		33	/	46	A	2013-01-01
H01L		33	/	64	A	2013-01-01
H01L		33	/	647	A	2013-01-01
H01L		2224	/	24	A	2013-01-01
H01L		2924	/	1461	A	2013-01-01
H01L		2924	/	12044	A	2013-01-01
			/			

CPC Combination Sets								
Symbol					Type	Set	Ranking	Version
H01L		2924	/	1461	A	1	1	2013-01-01
H01L		2924	/	00	A	1	2	2013-01-01
H01L		2924	/	12044	A	2	1	2013-01-01
H01L		2924	/	00	A	2	2	2013-01-01

NONE  (Assistant Examiner) _____ (Date) _____		<b>Total Claims Allowed:</b> 12	
/DAVID ZARNEKE/ Primary Examiner.Art Unit 2891 (Primary Examiner) _____ (Date) _____		O.G. Print Claim(s) 1	O.G. Print Figure 5





<b>Issue Classification</b> 	<b>Application/Control No.</b> 14047715	<b>Applicant(s)/Patent Under Reexamination</b> MARGALIT, MORDEHAI
	<b>Examiner</b> DAVID ZARNEKE	<b>Art Unit</b> 2891

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17												
2	2		18												
3	3		19												
4	4		20												
5	5	1	21												
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	11														
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	13														
	14														
	15														
	16														

NONE	<b>Total Claims Allowed:</b> 12	
(Assistant Examiner) _____ (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 5
/DAVID ZARNEKE/ Primary Examiner.Art Unit 2891 (Primary Examiner) _____ (Date)		



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## BIB DATA SHEET

CONFIRMATION NO. 6858

<b>SERIAL NUMBER</b> 14/047,715	<b>FILING or 371(c) DATE</b> 10/07/2013 <b>RULE</b>	<b>CLASS</b> 257	<b>GROUP ART UNIT</b> 2891	<b>ATTORNEY DOCKET NO.</b> VIA.USCIP.0110		
<b>APPLICANTS</b> <b>INVENTORS</b> Mordehai Margalit, Zichron Yaaqov, ISRAEL; <b>** CONTINUING DATA *****</b> This application is a CIP of 13/424,875 03/20/2012 and claims benefit of 61/710,156 10/05/2012 <b>** FOREIGN APPLICATIONS *****</b> ISRAEL PCT/IL2010/000772 09/20/2010 <b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY **</b> 11/06/2013						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Verified and Acknowledged <u>/DAVID A ZARNEKE/</u> Examiner's Signature		<input type="checkbox"/> Met after Allowance <u>daz</u> Initials	<b>STATE OR COUNTRY</b> ISRAEL	<b>SHEETS DRAWINGS</b> 12	<b>TOTAL CLAIMS</b> 20	<b>INDEPENDENT CLAIMS</b> 2
<b>ADDRESS</b> Intrinsic Law Corp. 760 Main Street Third Floor Waltham, MA 02451 UNITED STATES						
<b>TITLE</b> Light Emitting Diode Package with Enhanced Heat Conduction						
<b>FILING FEE RECEIVED</b> 800	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees		
				<input type="checkbox"/> 1.16 Fees (Filing)		
				<input type="checkbox"/> 1.17 Fees (Processing Ext. of time)		
				<input type="checkbox"/> 1.18 Fees (Issue)		
				<input type="checkbox"/> Other _____		
			<input type="checkbox"/> Credit			

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	10/7/2013
Examiner	David A. Zarneke
Art Unit	2891
For	"Light Emitting Diode Package with Enhanced Heat Conduction"
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

December 18, 2015

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION**

In response to the non-final Office Action mailed on October 2, 2015 in the above-identified application, Applicants present the following response in which:

- **Amendments to the Claims** are reflected in the listing of claims which begins on page 3; and
- **Remarks** begin on page 6.

If any further fees are required in this matter that have not been paid along with this Response, the Office is kindly requested and authorized to charge such fees to Applicants' attorneys' USPTO Deposit Account No. 505153.

Appl. Ser. No. 14/047,715

Attorney Docket No. VIA.USCIP.0110

Respectfully,

/Ibrahim M. Hallaj/

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1.617.420.0079  
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## IN THE CLAIMS

*The following listing replaces all prior versions of the claims.*

1.     **(Cancelled)** ~~A light emitting device, comprising:  
a carrier wafer, wherein a substantial amount of carrier wafer is removed  
to create a relief;  
a semiconductor LED including doped and intrinsic regions thereof, said  
semiconductor LED is affixed to said carrier wafer proximate to said relief;  
a thermally conductive layer disposed adjacent to said semiconductor  
LED in said relief;  
at least one optically reflective surface disposed between said carrier  
wafer and said semiconductor LED proximate to said carrier wafer; and  
a substantially optically transmissive layer proximal to said semiconductor  
LED covering at least a portion of the above components.~~
2.     **(Currently Amended)** The light emitting device of claim 21, said at  
least one optically reflective surface comprising metal.
3.     **(Withdrawn)** The light emitting device of claim 1, said at least one  
optically reflective surface comprising a dielectric stack.
4.     **(Currently Amended)** The light emitting device of claim 21, wherein  
said semiconductor LED is affixed to said carrier wafer with an adhesive material  
which has the property of high thermal conductivity.

5. (Withdrawn) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion.
6. (Withdrawn) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical reflection.
7. (Withdrawn) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical transmissivity.
8. **(Currently Amended)** The light emitting device of claim 21, further comprising at least one spacer attached to said carrier wafer; whereby, said at least one optically reflective surface is affixed thereto.
9. **(Currently Amended)** The light emitting device of claim 21, said thermally conductive layer comprises metal.
10. (Withdrawn) The light emitting device of claim 1, said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity.
11. (Withdrawn) A method for making light emitting device comprising the steps of:
  - forming a carrier wafer;

forming a plurality of doped layers in a light emitting device (LED)  
 disposed on an optically permissive layer;  
 using an optically permissive adhesive to mechanically secure said LED  
 onto said carrier wafer;  
 forming a recess in said carrier wafer proximate to said LED;  
 forming spacers on said carrier wafer proximate to said LED;  
 metalizing at least a portion of said spacers; and  
 filling said recess with a thermally conductive material.

12. (Withdrawn) The method for making light emitting device of claim 11,  
 further comprising encapsulating said LED with an optically permissive material  
 and mechanically securing an optically transmissive cover substrate.

13. (Withdrawn) The method of claim 12, further comprising suspending  
 photoluminescent particles in the optically permissive material.

14. **(Currently Amended)** ~~The method of claim 12, further comprising A~~  
method for making a light emitting device comprising the steps of:

forming a carrier wafer;  
forming a plurality of doped layers in a light emitting device (LED)  
disposed on an optically permissive layer;  
using an optically permissive adhesive to mechanically secure said LED  
onto said carrier wafer;  
forming a recess in said carrier wafer proximate to said LED, said recess  
exposing at least a portion of the LED;  
forming spacers on said carrier wafer proximate to said LED;

metalizing at least a portion of said spacers;

filling said recess with a thermally conductive material; and

suspending quantum dot particles in the optically permissive material.

15. (Withdrawn) The method of claim 11, wherein the thermally conductive material comprises metal.

16. (Withdrawn) The method of claim 11, wherein the thermally conductive material comprises an organic compound with high thermal conductivity.

17. (Cancelled)

18. (Withdrawn) The method of claim 11, wherein the optically permissive adhesive has the property of high thermal conductivity.

19. (Cancelled).

20. (Withdrawn) The method of claim 11, wherein the optically permissive adhesive has the property of optical diffusion.

21. **(New)** A light emitting device, comprising:  
     a substrate having opposing first and second substrate surfaces;  
     a semiconductor LED including doped and intrinsic regions thereof, said semiconductor LED having opposing first and second LED surfaces, said first LED surface disposed on the first substrate surface;



a thermally conductive layer disposed on the second LED surface of the semiconductor LED;

a carrier wafer disposed on the thermally conductive layer;

at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED; and

a substantially optically transmissive layer disposed proximal to the second substrate surface,

wherein the carrier wafer and the thermally conductive layer define a relief to expose at least a portion of the second LED surface.

22. **(New)** The light emitting device of claim 21, wherein the relief has a surface area displacement of 250,000 square microns.

23. **(New)** The light emitting device of claim 21, wherein the relief has a surface area displacement of at least 700 microns by 700 microns.

### Remarks

Applicant thanks the Office and Examiner Zarneke for the Office Action mailed on October 2, 2015 ("the Office Action"). Upon entry of this response, claims 2-16, 18, and 20-23 are pending. Claims 2, 4, 8, 9, and 14 are amended. Claims 21-23 are new. Claims 1, 17 and 18 are cancelled. Claims 3, 5-7, 10-13, 15, 16, 18, and 20 are withdrawn. Claims 1, 2, 4, 8, 9, and 14 are under examination and are rejected.

### Claim Rejections – 35 USC §103

The Office rejected claims 1, 2, 4, 8, 9, and 14 as being unpatentable over U.S. Patent Application Publication No. 2009/0262516 (Li).

In an effort to expedite prosecution and without waiver, Applicants have cancelled claim 1. Applicants have added new independent claim 21 to clarify the distinctions over the prior art.

Li discloses a light emitting device 10 that includes a LED chip 12 mounted within a dish-shaped package/housing 14. See Li at ¶ [0028]. The housing 14 defines a circular reflective recess/cup 16. *Id.* The LED chip 12 is mounted on a thermally conducting mounting pad 30 on the floor of recess 16. *Id.* Metallization layers 26, 28 cover the walls and floor of recess 16. *Id.*

Li does not teach or suggest a carrier wafer and a thermally conductive layer that "define a relief to expose at least a portion of the second LED surface," as recited in claim 21. First, Li does not teach or suggest a carrier wafer as recognized by the Office. See Office Action at 4. Second, even if a carrier wafer were substituted for package 14, the LED chip 12 is mounted on the

bottom surface of the recess 16 (the alleged relief). Thus, the recess 16 does not expose at least a portion of the LED chip 12.

Further, even If the recess 16 exposes a portion of the LED chip 12 (which it does not as discussed above), the opposing surface of LED chip 12 is disposed on thermally conducting mounting pad 30. It is not disposed proximal to an optically transmissive layer as recited in claim 21.

Applicants further traverse the rejection because the Office has not established a *prima facie* case of obviousness. The Office alleges that Li discloses "a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components" but the Office does not point to any structure or disclosure in Li to support this statement. The Office cannot rely on conclusory statements to establish a *prima facie* case of obviousness. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 538, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988, (Fed. Cir. 2006)) ("rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"); see also MPEP 2142.

For at least the foregoing reasons, Li does not teach or suggest each and every element of claim 21. Claims 2, 4, 8, and 9 depend on claim 21 and, therefore, are patentable over Li for at least the same reasons as claim 21. Claim 14 is patentable over Li for substantially the same reasons as claim 21.

Applicants request reconsideration and withdrawal of the rejection of claims 1, 2, 4, 8, 9, and 14 under 35 USC § 103. Applicants also request favorable review and allowance of new claims 21-23.

\* \* \*

Applicants request reconsideration of the rejections of the Office Action and look forward to an early and favorable action in this case. Applicants' attorneys welcome an interview with the Examiner if it will resolve questions relating to any aspect of the matter's prosecution.

If any fees are required for the present Amendment and Response or any other issue relating to this application, the Office is invited to charge such fees to deposit account number 50-5153.

Respectfully submitted,

/Ibrahim M. Hallaj/

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Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	24415289
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	18-DEC-2015
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	16:52:05
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no				
<b>File Listing:</b>					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	VIA_USCIP_0110_Response.pdf	81748 d9bc16b723a10442c36726b035d4e8ad53a7d6c7	no	10
<b>Warnings:</b>					
<b>Information:</b>					

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 14/047,715		Filing Date 10/07/2013		<input checked="" type="checkbox"/> To be Mailed	
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)							
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A			
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (j), or (m))		N/A		N/A		N/A			
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A			
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		X \$ =			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL			
APPLICATION AS AMENDED – PART II									
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	12/18/2015	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	x \$40 =		0	
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	x \$210 =		0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =			
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordechai Margalit	VIA.USCIP.0110	6858
93255	7590	10/02/2015		
Intrinsic Law Corp. 760 Main Street Third Floor Waltham, MA 02451			EXAMINER ZARNEKE, DAVID A	
			ART UNIT 2891	PAPER NUMBER
			MAIL DATE 10/02/2015	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



<b>Office Action Summary</b>	<b>Application No.</b> 14/047,715	<b>Applicant(s)</b> MARGALIT, MORDEHAI	
	<b>Examiner</b> David Zarneke	<b>Art Unit</b> 2891	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8/24/15.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims\***

- 5) ☒ Claim(s) 1-16, 18 and 20 is/are pending in the application.  
5a) Of the above claim(s) 3, 5-7, 10-13, 15, 16, 18, 20 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1, 2, 4, 8, 9 and 14 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☐ All    b) ☐ Some\*\*    c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 3) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)<br>Paper No(s)/Mail Date ____. | 4) <input type="checkbox"/> Other: ____.  |

### **DETAILED ACTION**

The present application is being examined under the pre-AIA first to invent provisions.

### ***Election/Restrictions***

Applicant's election with traverse of Group I, and species 1a, 2a, 3a and 4b in the reply filed on 8/24/15 and 1/14/15 is acknowledged. The traversal is on the ground(s) that support for how the species are different in operation, design or effect has not been provided.

This is not found persuasive because:

In species 1, the species are different in design because one is a metal and the other is a dielectric. These are clearly different materials.

In species 2, the species are different in design because each identifies a different property of the adhesive material.

In species 3, the species are different in design because one is a metal and the other is an organic material. These are clearly different materials.

In species 4, the species are different in design because one is a photoluminescent particle and the other is a quantum dot particle. These are clearly different materials.

The requirement is still deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 103***

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 2, 4, 8, 9, and 14 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Li, US 2009/0262516.

Regarding claim 1, Li teaches a light emitting device, comprising:

a carrier wafer [14], wherein a substantial amount of carrier wafer is removed to create a relief [16];

a semiconductor LED [12], said semiconductor LED is affixed to said carrier wafer proximate to said relief;

a thermally conductive layer [30] disposed adjacent to said semiconductor LED in said relief;

at least one optically reflective surface ([26]&[28]) disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer; and

a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components.

While Li fails to teach a wafer, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a wafer of multiple devices in place of the single device in the invention of Li because this is conventionally known and used in the art to reduce cost and increase production time. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

Further, even though Li fails to teach the LED includes doped and intrinsic regions thereof, it would have been obvious to one of ordinary skill in the art at the time of the invention to use doped and intrinsic regions in the LED of Li because this is a conventionally known and used in the art LED configuration. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

With respect to claim 2, Li teaches at least one optically reflective surface comprising metal (paragraph [0028], lines 20-24).

As to claim 4, Li teaches said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity (paragraph [0028], lines 24-26).

In re claim 8, Li teaches at least one spacer attached to said carrier wafer; whereby, said at least one optically reflective surface is affixed thereto (paragraph [0028], lines 13-15:wherein the spacer is integral to the carrier wafer).

Concerning claim 9, though Li fails to teach the thermally conductive layer comprises metal, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a metal thermally conductive layer in the invention of Li because metal is a conventionally known and used in the art thermally conductive layer. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

Regarding claim 14, though Li fails to teach suspending quantum dot particles in the optically permissive material, it would have been obvious to one of ordinary skill in the art at the time of the invention to suspend quantum dot particles in the optically permissive material in the invention of Li because suspending quantum dot particles in the optically permissive material is conventionally known and used in the art. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Zarneke whose telephone number is (571)272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571)-272-1731. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Zarneke/  
Primary Examiner, Art Unit 2891  
9/29/15

<b>Notice of References Cited</b>	Application/Control No. 14/047,715		Applicant(s)/Patent Under Reexamination MARGALIT, MORDEHAI	
	Examiner David Zarneke		Art Unit 2891	Page 1 of 2

#### U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2009/0262516 A1	10-2009	Li; Yi-Qun	H01L33/56	362/84
*	B	US-7,411,225 B2	08-2008	Kim; Geun-Ho	H01L33/486	257/100
*	C	US-2011/0006322 A1	01-2011	LI; Junjie	H01L33/486	257/98
*	D	US-8,044,412 B2	10-2011	Murphy; Thomas	H01L23/60	257/81
*	E	US-2008/0067534 A1	03-2008	Hsieh; Min-Hsun	H01L33/486	257/98
*	F	US-2013/0049564 A1	02-2013	JUNG; Su Jung	H01S5/02469	313/45
*	G	US-2013/0294471 A1	11-2013	Palaniswamy; Ravi	H01L33/486	372/43.01
*	H	US-4,797,715 A	01-1989	Thillays; Jacques C.	H01L33/005	257/627
*	I	US-2014/0110728 A1	04-2014	Lee; Shi-Wei	H01L24/16	257/88
*	J	US-2007/0228386 A1	10-2007	Shie; Jin-Shown	H01L33/486	257/79
*	K	US-2008/0029570 A1	02-2008	Shelton; Frederick E.	A61B17/068	227/175.1
*	L	US-2006/0208271 A1	09-2006	Kim; Geun-Ho	H01L33/486	257/100
*	M	US-2014/0103798 A1	04-2014	YAMANAKA; Kazuhiko	H05B33/04	313/512

#### FOREIGN PATENT DOCUMENTS

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<b>Notice of References Cited</b>	Application/Control No. 14/047,715	Applicant(s)/Patent Under Reexamination MARGALIT, MORDEHAI	
	Examiner David Zarneke	Art Unit 2891	Page 2 of 2

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2013/0105978 A1	05-2013	Hung; Chih-Lung	H01L33/60	257/751
*	B	US-2012/0034716 A1	02-2012	LIN; SHEN-BO	H01L33/58	438/27
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		14047715	
	Filing Date		2013-10-07	
	First Named Inventor	Mordehai Margalit		
	Art Unit	2891		
	Examiner Name	David A. Zarneke		
	Attorney Docket Number	VIA.USCIP.0110		

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	1	20060092532	A1	2006-05-04	Ouderkirk et al.	
	2	20060163683	A1	2006-06-27	Roth et al.	
	3	20060278885	A1	2006-12-14	Tain et al.	
	4	20100068421	A1	2010-03-18	Tse et al.	
	5	20110309382	A1	2011-12-22	Lowgren	
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Art Unit	2891
Examiner Name	David A. Zarneke
Attorney Docket Number	VIA.USCIP.0110

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
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	1	US INTERNATIONAL SEARCHING AUTHORITY OF THE PATENT COOPERATION TREATY, "Application No. PCT/IB13/03043 International Search Report", Aug. 18, 2014	<input type="checkbox"/>

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Examiner Name	David A. Zameke
Attorney Docket Number	VIA.USCIP.0110

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- ☒ See attached certification statement.
- ☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Ibrahim M. Hallaj/	Date (YYYY-MM-DD)	2014-09-05
Name/Print	Ibrahim M. Hallaj	Registration Number	51768

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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	1	7910940	B2	2011-03-22	Koike et al.	
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	1	20060073692	A1	2006-04-06	Yoshida et al.	
	2	20090291518	A1	2009-11-26	Kim et al.	
	3	20030006418	A1	2003-01-09	Emerson et al.	
	4	20090283787	A1	2009-11-19	Donofrio et al.	
	5	20070166851	A1	2007-07-19	Tran et al.	
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Signature	/Ibrahim M. Hallaj/	Date (YYYY-MM-DD)	2014-06-20
Name/Print	Ibrahim M. Hallaj	Registration Number	51768

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		14047715
	Filing Date		2013-10-07
	First Named Inventor	Mordehai Margalit	
	Art Unit	2891	
	Examiner Name	N/A	
	Attorney Docket Number	VIA.USCIP.0110	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6501091		2002-12-31	Bawendi	
	2	7232754		2007-06-19	Kirby et al.	
	3	7951625		2011-05-31	Kamei	
	4	8278213		2012-10-02	Kameyama et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100207145		2010-08-19	Yoo	
	2	20060006404		2006-01-12	Ibbetson et al.	

/David Zarneke/

09/29/2015

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	14047715
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3	20090173958		2009-07-09	Chakraborty et al.	
4	20060284321		2006-12-21	Wu et al.	
5	20100053929		2010-03-04	Bisberg	
6	20060011935		2006-01-19	Krames	
7	20080068845		2008-03-20	Aida et al.	
8	20100148193		2010-06-17	Duong et al.	
9	20060081869		2006-04-20	Lu et al.	
10	20050017258		2005-01-27	Fehrer et al.	
11	20090267096		2009-10-29	Kim	
12	20110006322		2011-01-13	Li et al.	
13	20090273002		2009-11-05	Chiou et al.	

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STATEMENT BY APPLICANT**  
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Art Unit	2891
Examiner Name	N/A
Attorney Docket Number	VIA.USCIP.0110

	14	20090108283		2009-04-30	Kadotani et al.	
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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
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Examiner Signature	/David Zarneke/	Date Considered	09/29/2015
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	14047715
Filing Date	2013-10-07
First Named Inventor	Mordehai Margalit
Art Unit	2891
Examiner Name	N/A
Attorney Docket Number	VIA.USCIP.0110

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

- ☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

- ☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- ☐ See attached certification statement.
- ☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Ibrahim M. Hallaj/	Date (YYYY-MM-DD)	2013-11-22
Name/Print	Ibrahim M. Hallaj	Registration Number	51768

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	71	((("20060092532") or ("20060163683") or ("20060278885") or ("20100068421") or ("20110309382") or ("7910940") or ("2060073692") or ("20090291518") or ("20030006418") or ("20090283787") or ("20070166851") or ("6501091") or ("7232754") or ("7951625") or ("8278213") or ("20100207145") or ("20060006404") or ("20090173958") or ("20060284321") or ("20100053929") or ("20060011935") or ("20080068845") or ("20100148193") or ("20060081869") or ("20050017258") or ("20090267096") or ("20110006322") or ("20090273002") or ("20090108283")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/09/29 00:35
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S3	0	"20110006322".pn. and "52"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 01:14
S4	1	"20110006322".pn. and "40"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 01:20
S5	1	(12/708943).APP.	USPAT; USOCR	OR	ON	2015/09/29 01:21
S6	1	(12/708943).APP.	USPAT; USOCR	OR	ON	2015/09/29 01:22
S7	4	("20100237378"   "7663231"   "7943426").PN. OR ("8445919").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 01:22
S8	17475	257/98,99.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 01:28
S9	7997	257/99.ccls.	US-PGPUB;	OR	ON	2015/09/29

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S12	686	h0112933/0033.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 01:37
S13	5004	h01133/483,486.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 01:37
S14	221	h0112933/0075.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 02:07
S15	1076	h01133/64,644.cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 02:08
S16	0	(11/396383).APP.	USPAT; USOCR	OR	ON	2015/09/29 03:45
S17	10	("2007/0228386").URPN.	USPAT	OR	ON	2015/09/29 03:45
S18	1	(11/086186).APP.	USPAT; USOCR	OR	ON	2015/09/29 03:47
S19	19	("20050035363"   "4797715"   "5879572"   "6498355"   "6507049"   "6531328"   "6599768").PN. OR ("7411225").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 03:48
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S22	0	"20110006322".pn. and "52"	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2015/09/29 09:30

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S25	1	(12/708943).APP.	USPAT; USOCR	OR	ON	2015/09/29 09:30
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S27	17475	257/98,99.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2015/09/29 09:30
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S51	5562933	optical\$3	US-PGPUB;	OR	ON	2015/09/29

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			13:29
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S55	8	S53 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 13:38
S56	0	S53 and "65" not S55	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 14:04
S57	3	S53 not S55	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 14:04
S58	311826	"20090262516".pn. adn quantum	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/09/29 15:22
S59	0	"20090262516".pn. and quantum	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/09/29 15:22


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**9/ 29/ 2015 5:05:57 PM**

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<b>Search Notes</b>  	<b>Application/Control No.</b>  14047715	<b>Applicant(s)/Patent Under Reexamination</b>  MARGALIT, MORDEHAI
	<b>Examiner</b>  DAVID ZARNEKE	<b>Art Unit</b>  2891

CPC- SEARCHED		
Symbol	Date	Examiner
H01L 33/64,644,641,642,644,645,647,648, 483,486; 2933/0033,0075,64,644,	9/29/15	daz

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
257	98,99	9/29/15	daz

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search - see history	9/29/15	daz

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	10/7/2013
Examiner	David A. Zarneke
Art Unit	2891
For	"Light Emitting Diode Package with Enhanced Heat Conduction"
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

August 24, 2015

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO OFFICE ACTION**

In response to the Office Action mailed on June 23, 2015 in the above-identified application, Applicants present the following response in which:

- **Amendments to the claims** are reflected in the listing of the claims which begins on page 3; and
- **Remarks** begin on page 7.

If any further fees are required in this matter that have not been paid along with this Response, the Office is kindly requested and authorized to charge such fees to Applicants' attorney's USPTO Deposit Account No. 50-5153.

Appl. Ser. No. 14/047,715

Attorney Docket No. VIA.USCIP.0110

Respectfully,

/Ibrahim M. Hallaj/

Ibrahim M. Hallaj, Esq.  
Attorney for Applicants  
Reg. No. 51,768  
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1.617.420.0079  
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**IN THE CLAIMS**

*The following listing replaces all prior versions of the claims.*

1. (Original) A light emitting device, comprising:
  - a carrier wafer, wherein a substantial amount of carrier wafer is removed to create a relief;
  - a semiconductor LED including doped and intrinsic regions thereof, said semiconductor LED is affixed to said carrier wafer proximate to said relief;
  - a thermally conductive layer disposed adjacent to said semiconductor LED in said relief;
  - at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer; and
  - a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components.
2. (Original) The light emitting device of claim 1, said at least one optically reflective surface comprising metal.
3. **(Withdrawn)** The light emitting device of claim 1, said at least one optically reflective surface comprising a dielectric stack.
4. (Original) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity.

5. **(Withdrawn)** The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion.
6. **(Withdrawn)** The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical reflection.
7. **(Withdrawn)** The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical transmissivity.
8. (Original) The light emitting device of claim 1, further comprising at least one spacer attached to said carrier wafer; whereby, said at least one optically reflective surface is affixed thereto.
9. (Original) The light emitting device of claim 1, said thermally conductive layer comprises metal.
10. **(Withdrawn)** The light emitting device of claim 1, said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity.
11. (Withdrawn) A method for making light emitting device comprising the steps of:
  - forming a carrier wafer;



forming a plurality of doped layers in a light emitting device (LED)  
disposed on an optically permissive layer;  
using an optically permissive adhesive to mechanically secure said LED  
onto said carrier wafer;  
forming a recess in said carrier wafer proximate to said LED;  
forming spacers on said carrier wafer proximate to said LED;  
metalizing at least a portion of said spacers; and  
filling said recess with a thermally conductive material.

12. (Withdrawn) The method for making light emitting device of claim 11,  
further comprising encapsulating said LED with an optically permissive material  
and mechanically securing an optically transmissive cover substrate.

13. (Withdrawn) The method of claim 12, further comprising suspending  
photoluminescent particles in the optically permissive material.

14. **(Original)** The method of claim 12, further comprising suspending  
quantum dot particles in the optically permissive material.

15. (Withdrawn) The method of claim 11, wherein the thermally conductive  
material comprises metal.

16. (Withdrawn) The method of claim 11, wherein the thermally conductive  
material comprises an organic compound with high thermal conductivity.

17. **(Cancelled)**

18. (Withdrawn) The method of claim 11, wherein the optically permissive adhesive has the property of high thermal conductivity.

19. **(Cancelled).**

20. (Withdrawn) The method of claim 11, wherein the optically permissive adhesive has the property of optical diffusion.

**Remarks**

Applicant thanks the Office and Examiner Zarneke for the Office Action mailed on June 23, 2015 ("the Office Action"). Claims 1-16, 18, and 20 are pending. Claims 3, 5-7, 10-13, 15, 16, 18, and 20 are withdrawn. Claim 14 was previously withdrawn but has been re-presented for examination in response to the Office Action. Claim 19 was previously cancelled and claim 17 is hereby cancelled.

In the Office Action, the Office states that Applicant's March 16, 2015 response to the restriction requirement was deficient because it did not include an election of species from any of the groups. According to the Office Action "[f]or the response to be considered complete, it must include an election of 1 species from EACH of groups 1-4." See Office Action at 2. In order to advance prosecution, Applicant has elected with traverse a species from each species group, as discussed below. However, Applicant notes that the original restriction requirement only required the election of a single species (now referred to as "groups"). See Restriction Requirement at 4-5.

Reserving all rights and incorporating by reference Applicant's March 16, 2015 response to the restriction requirement, Applicant hereby elects the following species and corresponding claims with traverse:

<b>Elected Species Number</b>	<b>Corresponding Elected Claim<sup>1</sup></b>
1a (optically reflective surface comprises metal)	2
2a (LED adhesive/ optically permissive	4

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<sup>1</sup> The corresponding elected claims are from elected invention Group I (claims 1-10, drawn to a product), with the exception of elected species number 4b (see footnote 2). There are additional claims that correspond to these species from non-elected invention Group II (claims 11-20, drawn to a process).

adhesive material has the property of high thermal conductivity)	
3a (thermally conductive layer comprises metal)	9
4b (optically permissive material comprises suspended quantum dot particles)	14 <sup>2</sup>

Applicant's representative welcomes any correspondence or interviews with the Examiner to facilitate the prosecution of the application.

If any fees are required for the present Amendment and Response or any other issue relating to this application, the Office is invited to charge such fees to deposit account number **50-5153**.

Respectfully submitted,

/Ibrahim M. Hallaj/

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 Customer No. 93255  
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 Waltham, MA 02451  
 617.420.0079  
 docketing@intrinsiclaw.com

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<sup>2</sup> Applicant notes that the claims corresponding to species group 4 (claims 13 and 14) are in non-elected invention Group II (claims 11-20, drawn to a process). Thus, Applicant cannot elect a species from species group 4 that corresponds to a claim from elected invention Group I (claims 1-10, drawn to a product).

Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	23294129
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	24-AUG-2015
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	16:36:36
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Arguments/Remarks Made in an Amendment	VIA_USCIP_0110_Response.pdf	80392 c905383ad118d02201bd8f51157511e9ed241fd1	no	8

### Warnings:

### Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 14/047,715	Filing Date 10/07/2013	<input type="checkbox"/> To be Mailed
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ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

**APPLICATION AS FILED – PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (j), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED – PART II**

(Column 1) (Column 2) (Column 3)

AMENDMENT	08/24/2015	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	x \$40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x \$210 =	0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
TOTAL ADD'L FEE						0	

(Column 1) (Column 2) (Column 3)

AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
TOTAL ADD'L FEE							

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE  
/JUDY SWAYNE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordechai Margalit	VIA.USCIP.0110	6858
93255	7590	06/23/2015		
Intrinsic Law Corp. 760 Main Street Third Floor Waltham, MA 02451			EXAMINER ZARNEKE, DAVID A	
			ART UNIT 2891	PAPER NUMBER
			MAIL DATE 06/23/2015	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



<b>Office Action Summary</b>	<b>Application No.</b> 14/047,715	<b>Applicant(s)</b> MARGALIT, MORDEHAI	
	<b>Examiner</b> David Zarneke	<b>Art Unit</b> 2891	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 1/14/15.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims\***

- 5) ☒ Claim(s) 1-20 is/are pending in the application.  
5a) Of the above claim(s) 11-20 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☒ Claim(s) 1-10 are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☐ All    b) ☐ Some\*\*    c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 3) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)<br>Paper No(s)/Mail Date ____. | 4) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Response to Amendment*

The reply filed on 1/14/15 is not fully responsive to the prior Office action because of the following omission(s) or matter(s): the election didn't include an election of a species from any of the groups. The species restriction requires an election of 1 species of each of groups 1-4. See 37 CFR 1.111. Since the above-mentioned reply appears to be *bona fide*, applicant is given a TIME PERIOD of **TWO (2) MONTHS** from the mailing date of this notice within which to supply the omission or correction in order to avoid abandonment. EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).

For the response to be considered complete, it must include an election of 1 species from EACH of groups 1-4.

### *Claim Rejections - 35 USC § 112*

The 112 rejection has been withdrawn based upon the cancellation of claim 19.

### *Election/Restrictions*

Applicant's election with traverse of Group I, claims 1-10, in the reply filed on 3/16/15 is acknowledged. The traversal is on the ground(s) that the claims have similar principles that don't require undue searching and that there is no undue burden. This is

not found persuasive because the different classification is, in itself, the undue search burden.

The requirement is still deemed proper and is therefore made FINAL.

### ***Conclusion***

Any inquiry concerning this communication from the examiner should be directed to David Zarneke at (571)272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM. If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571)-272-1731. The fax phone number is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Zarneke/  
Primary Examiner, Art Unit 2891  
6/15/15

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	10/7/2013
Examiner	David A. Zarneke
Art Unit	2891
For	"Light Emitting Diode Package with Enhanced Heat Conduction"
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

March 16, 2015

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO REQUIREMENT FOR RESTRICTION/ELECTION**

In response to the Office Action mailed on Jan. 14, 2015 in the above-identified application, Applicants present the following response.

If any further fees are required in this matter that have not been paid along with this Response, the Office is kindly requested and authorized to charge such fees to Applicants' attorney's USPTO Deposit Account No. 505153.

Respectfully,

/Ibrahim M. Hallaj/

Ibrahim M. Hallaj, Esq.  
Attorney for Applicants  
Reg. No. 51,768

Appl. Ser. No. 14/047,715

Attorney Docket No. VIA.USCIP.0110

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Waltham, MA, 02451  
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USPTO Cust. No. 93255  
[docketing@intrinsiclaw.com](mailto:docketing@intrinsiclaw.com)

## IN THE CLAIMS

*The following listing replaces all prior versions of the claims.*

1. (Original) A light emitting device, comprising:
  - a carrier wafer, wherein a substantial amount of carrier wafer is removed to create a relief;
  - a semiconductor LED including doped and intrinsic regions thereof, said semiconductor LED is affixed to said carrier wafer proximate to said relief;
  - a thermally conductive layer disposed adjacent to said semiconductor LED in said relief;
  - at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer; and
  - a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components.
2. (Original) The light emitting device of claim 1, said at least one optically reflective surface comprising metal.
3. (Original) The light emitting device of claim 1, said at least one optically reflective surface comprising a dielectric stack.
4. (Original) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity.

5. (Original) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion.
6. (Original) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical reflection.
7. (Original) The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical transmissivity.
8. (Original) The light emitting device of claim 1, further comprising at least one spacer attached to said carrier wafer; whereby, said at least one optically reflective surface is affixed thereto.
9. (Original) The light emitting device of claim 1, said thermally conductive layer comprises metal.
10. (Original) The light emitting device of claim 1, said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity.
11. (Withdrawn) A method for making light emitting device comprising the steps of:
  - forming a carrier wafer;

forming a plurality of doped layers in a light emitting device (LED)  
disposed on an optically permissive layer;  
using an optically permissive adhesive to mechanically secure said LED  
onto said carrier wafer;  
forming a recess in said carrier wafer proximate to said LED;  
forming spacers on said carrier wafer proximate to said LED;  
metalizing at least a portion of said spacers; and  
filling said recess with a thermally conductive material.

12. (Withdrawn) The method for making light emitting device of claim 11,  
further comprising encapsulating said LED with an optically permissive material  
and mechanically securing an optically transmissive cover substrate.

13. (Withdrawn) The method of claim 12, further comprising suspending  
photoluminescent particles in the optically permissive material.

14. (Withdrawn) The method of claim 12, further comprising suspending  
quantum dot particles in the optically permissive material.

15. (Withdrawn) The method of claim 11, wherein the thermally conductive  
material comprises metal.

16. (Withdrawn) The method of claim 11, wherein the thermally conductive  
material comprises an organic compound with high thermal conductivity.



17. (Withdrawn) The method of claim 11, wherein the thermally conductive material comprises metal.

18. (Withdrawn) The method of claim 11, wherein the optically permissive adhesive has the property of high thermal conductivity.

19. **(Cancelled).**

20. (Withdrawn) The method of claim 11, wherein the optically permissive adhesive has the property of optical diffusion.

### Remarks

Applicant thanks the Office and Examiner Zarneke for the Office Action mailed on Jan. 14, 2015 ("the Office Action"). Claims 1 – 20 were presented and have been subject to the instant restriction requirement in the Office Action. Claim 19 is hereby cancelled. Reserving all rights, and without consenting to the characterizations of the claimed invention in the Office Action, Applicants hereby elect Group I (claims 1-10), with traverse.

### Claim Rejections – 35 USC §112

The Office Action rejected claims 18 and 19 under 35 USC §112(d) (pre-AIA 112 4<sup>th</sup> paragraph) as being in improperly dependent form for failing to limit the claimed subject matter, specifically for being identical in scope to one another. Applicant hereby cancels claim 19, which overcomes this rejection.

### The Restriction and Applicants' Response

Responsive to the restriction requirement, Applicant elects with traverse as follows.

The Office Action set forth two groups: Group I said to be directed to a product (Claims 1 – 10) and Group II said to be directed to a process (Claims 11 – 20). The presented claims are intended to be connected in design, operation and/or effect and are sufficiently grounded in the same principles as to not require undue searching to prosecute the various claims in one application as admitted in the Office Action, which states "*Inventions I and II are related as process of making and product made.*" (Office Action, p. 3). Furthermore, Applicant does not consent to the characterizations made in the Office Action

regarding the inventions claimed. Applicant's description and claims stand on their own merits and properly support examination of the original claims of the application as submitted. Therefore, Applicant does not agree that searching the submitted claims would pose a "*serious search and/or examination burden*" as stated. *Id.* Finally, Applicant does not concede that traversal of the restriction means or implies that one or more of the original claims are "*obvious variants*" or not "*patentably distinct*" from one another. (See, Office Action, pp. 4, 6)

The standard for restricting an application does not depend on whether examination of the applicant's claims would cause "*serious search and/or examination burden*" as stated in the Office Action, which Applicant does not agree is the case here. Even if the claimed inventions are distinct as stated in MPEP Sec. 803, this does not justify the automatic restriction as presented, including by species. Accordingly, Applicants reserve their rights, electing Group I claims 1 – 10, with traverse, subject to such reservation and without waiver.

Moreover, the Office Action goes on to define several alleged species as follows (Office Action, pp. 4 – 5):

**1. ~~optically reflective surface comprises:~~**

- a. ~~metal; or~~**
- b. ~~dielectric stack.~~**

2. LED adhesive/ ~~optically permissive adhesive~~ material has the property of:

- a. high thermal conductivity; or
- b. optical diffusion; or
- c. optical reflection; or
- d. optical transmissivity..

3. thermally conductive layer comprises:

- a. metal; or
- b. an organic material with a physical property of high thermal conductivity.

4. ~~optically permissive~~ material comprises:

- a. suspended photoluminescent particles; or
- b. suspended quantum dot particles..

(Office Action, pp. 4 – 5).

The Office Action states that “*The species are independent because they are a different operation, design or effect in that they result in a different effect upon the final device [and are not obvious variants of each other].*” (Office Action, p. 5). This is improper restriction practice. First, the Office Action makes no mention of what claims are alleged to fall into what species. The restriction as presented, including the alleged *four* (or is it *ten* as broken out by sub-numeral?) “species” thereof is improper and should be withdrawn. Applicant therefore traverses the “species” allegations of the Office Action for at least that the

Office Action does not clearly state how many alleged species are being asserted.

Additionally Applicant traverses the "species" allegations as they are improperly framed. There is no support for restricting an application on the basis that alleged species have "different operation" or "different design" or "different effect" as given in the Office Action at p. 5. Applicant challenges this analysis as a basis to assert electable species in an application. It appears that the Examiner is confusing various embodiments with legally restrictable species that cannot be placed in a same application. There is no legal basis for restricting one embodiment from another in an application merely because it is argued to have a different design/operation/effect. Nor does a conclusion that any embodiments are "obvious variants" of one another automatically support such a restriction either. Applicant requires a proper justification based on the Rules of practice for this analysis and conclusion, which currently the Office Action lacks.

Still further, Applicant traverses the restriction and the "species" allegations of the Office Action because they are not connected with a claimed invention that Applicant may consider. The burden on demonstrating restricted inventions here is being placed on the Applicant and the Examiner has not properly identified which inventions (as claimed) are alleged to pose the purported burden and need for restriction.

In support of its remarks, Applicant reviews what the MPEP considers to be the "Definition of Restriction." The MPEP Sec. 802.2 states that a "*Restriction is the practice of requiring an applicant to elect a single claimed invention ... for examination when two or more independent inventions and/or two or more*

*distinct inventions are claimed in an application.*" It is erroneous to argue a restriction based on the general embodiments offered by the Office Action as "species" (Office Action, pp. 4 – 5) instead of considering the claims as they were presented.

The statute (e.g., 35 USC Sec. 121) and the MPEP (e.g., Sec. 802.02 et seq.) are clear that it is the claimed *inventions* that determine the restriction and trigger the need for divisional submissions. For example, the MPEP states "*If the search and examination of all the claims in an application can be made without serious burden, the examiner must examine them on the merits, even though they include claims to independent or distinct inventions.*" (MPEP Sec. 803, *emph. added*). The same section of the MPEP requires in a restriction that "*The inventions must be independent...or distinct as claimed*". This clearly means that the examiner must review and enumerate the claims being alleged for patentable distinctions and independence, and cannot merely recite the various embodiments or features of the invention(s), assigning them inventive distinction merely because they are "*different*" from one another, potentially obviating the entire practice of multiple claims or dependent claiming in an application. Applicant does not agree that the alleged species are demonstrable upon the statements of the Office Action as presented. It is improper for the Examiner to make such an allegation, then require the Applicant to identify which claims are directed to which embodiments or features (Office Action, p. 5).

Further to their comments above regarding Groups I and II, Applicants further, and in the alternative, traverse the "species" portion of the Office Action and request that it be withdrawn.

### Conclusion

Responsive to the restriction requirement, Applicant elects independent claim 1 *et seq* with traverse, which according to the Office Action (as best it is understood) corresponds to Group I and the "species" described as 2.d on p. 4 of the Office Action. Applicant reserves all rights to pursue all subject matter supported by his application and to take up arguments and appeals on the above grounds.

The restriction as stated, especially as to the alleged "species" is improper. A favorable reconsideration of the Office Action is sought. If the Examiner wishes to discuss this matter, preferably with his Supervisor, Applicants' attorney is available for a conference on this issue.

If any fees are required for the present Amendment and Response or any other issue relating to this application, the Office is invited to charge such fees to deposit account number **50-5153**.

Respectfully submitted,

/Ibrahim M. Hallaj/

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March 16, 2015

Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	21778237
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	16-MAR-2015
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	14:40:42
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	VIA_USCIP_0110_Restriction_R esp.pdf	445118 <small>50278eaf6625c3532179ffafaf4fd48eae316fb</small>	no	12

### Warnings:

### Information:



This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number 14/047,715	Filing Date 10/07/2013	<input type="checkbox"/> To be Mailed
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ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

**APPLICATION AS FILED – PART I**

(Column 1)	(Column 2)		RATE (\$)	FEE (\$)
FOR	NUMBER FILED	NUMBER EXTRA		
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (j), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED – PART II**

(Column 1)	(Column 2)	(Column 3)		RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	03/16/2015	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
	Total (37 CFR 1.16(i))	* 19	Minus ** 20	= 0	x \$40 = 0
	Independent (37 CFR 1.16(h))	* 2	Minus *** 3	= 0	x \$210 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))				
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				
					TOTAL ADD'L FEE
					0

(Column 1)	(Column 2)	(Column 3)		RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	
	Total (37 CFR 1.16(i))	*	Minus **	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))				
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				
					TOTAL ADD'L FEE

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE  
/PARTHENIA D. MERRILL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/047,715	10/07/2013	Mordechai Margalit	VIA.USCIP.0110	6858
93255	7590	01/14/2015		
Intrinsic Law Corp. 760 Main Street Third Floor Waltham, MA 02451			EXAMINER ZARNEKE, DAVID A	
			ART UNIT 2891	PAPER NUMBER
			MAIL DATE 01/14/2015	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 14/047,715	<b>Applicant(s)</b> MARGALIT, MORDEHAI	
	<b>Examiner</b> David Zarneke	<b>Art Unit</b> 2891	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims\***

- 5) ☒ Claim(s) 1-20 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 9) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☐ All    b) ☐ Some\*\*    c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 3) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)<br>Paper No(s)/Mail Date _____ | 4) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of 35 U.S.C. 112(d):

(d) REFERENCE IN DEPENDENT FORMS.—Subject to subsection (e), a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), fourth paragraph:

Subject to the [fifth paragraph of 35 U.S.C. 112 (pre-AIA)], a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

Claims 18 and 19 are rejected under 35 U.S.C. 112(d) or pre-AIA 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends. These claims are exactly the same and depend upon the same claim. Applicant may cancel the claim(s), amend the claim(s) to place the claim(s) in proper dependent form, rewrite the claim(s) in independent form, or present a sufficient showing that the dependent claim(s) complies with the statutory requirements.

### ***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-10, drawn to a product, classified in H01L33/44.
- II. Claims 11-20, drawn to a process, classified in H01L2933/0025.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process. For example, the product doesn't require spacers to be formed or a metallized region, let alone metallized spacers. The product only requires a recess.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

Different classification.

**Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time

of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

This application contains claims directed to the following patentably distinct species:

1. optically reflective surface comprises:
  - a. metal; or
  - b. dielectric stack.
2. LED adhesive/ optically permissive adhesive material has the property of:
  - a. high thermal conductivity; or
  - b. optical diffusion; or
  - c. optical reflection; or
  - d. optical transmissivity.
3. thermally conductive layer comprises:
  - a. metal; or

b. an organic material with a physical property of high thermal conductivity.

4. optically permissive material comprises:

a. suspended photoluminescent particles; or

b. suspended quantum dot particles.

The species are independent or distinct because they are a different operation, design or effect in that they result in a different effect upon the final device. In addition, these species are not obvious variants of each other based on the current record.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1, 8, 11 and 12 are generic.

There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply: they have a separate status based upon their separate inventive effort. Each species required a considered inventive effort to determine the added and/or varied value to the device.

**Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined** even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.



The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Zarneke whose telephone number is (571)272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571)-272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Zarneke/  
Primary Examiner, Art Unit 2891  
1/7/15

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		14047715
	Filing Date		2013-10-07
	First Named Inventor	Mordehai Margalit	
	Art Unit	2891	
	Examiner Name	David A. Zarneke	
	Attorney Docket Number	VIA.USCIP.0110	

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	1	20060092532	A1	2006-05-04	Ouderkirk et al.	
	2	20060163683	A1	2006-06-27	Roth et al.	
	3	20060278885	A1	2006-12-14	Tain et al.	
	4	20100068421	A1	2010-03-18	Tse et al.	
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		14047715	
	Filing Date		2013-10-07	
	First Named Inventor	Mordehai Margalit		
	Art Unit	2891		
	Examiner Name	David A. Zarneke		
	Attorney Docket Number	VIA.USCIP.0110		

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> i	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
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	1	US INTERNATIONAL SEARCHING AUTHORITY OF THE PATENT COOPERATION TREATY, "Application No. PCT/IB13/03043 International Search Report", Aug. 18, 2014					<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

EXAMINER SIGNATURE	
Examiner Signature	Date Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	14047715
	Filing Date	2013-10-07
	First Named Inventor	Mordehai Margalit
	Art Unit	2891
	Examiner Name	David A. Zarneke
	Attorney Docket Number	VIA.USCIP.0110

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Ibrahim M. Hallaj/	Date (YYYY-MM-DD)	2014-09-05
Name/Print	Ibrahim M. Hallaj	Registration Number	51768

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	Oct. 7, 2013
Examiner	David A. ZARNEKE
Art Unit	2891
For	"LIGHT EMITTING DIODE PACKAGE WITH ENHANCED HEAT CONDUCTION"
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

September 5, 2014

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**STATEMENT FILED PURSUANT TO THE DUTY OF DISCLOSURE**

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, the Applicant(s) request consideration of this Supplemental Information Disclosure Statement. The Applicant(s) hereby make the following information of record in the above-identified application.

The Applicant(s) would like to bring to the Examiner's attention the following co-pending applications that may contain subject matter related to this application:

13/424,875	"Wafer Level Packaging of Electronic Devices"
PCT/IB13/03043	"Light Emitting Diode Package with Enhanced Heat Conduction"

By submitting this Supplemental Information Disclosure Statement, the Applicant(s) make no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

By submitting this Supplemental Information Disclosure Statement, the Applicant(s) make no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R §1.56(b).

By submitting this Supplemental Information Disclosure Statement, the Applicant(s) make no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. §102.

Notwithstanding any statements by the Applicant(s), the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

If any fees are required in this matter that have not been paid along with this Statement, the Office is kindly requested and authorized to charge such fees to USPTO Deposit Account No. 505153.

Respectfully,

/Ibrahim M. Hallaj/

---

Ibrahim M. Hallaj, Esq.  
Attorney for Applicant  
Reg. No. 51,768  
Intrinsic Law Corp.  
760 Main Street, Third Floor  
Waltham, MA, 02451  
1.617.420.0078  
**USPTO Cust. No. 93255**  
docketing@intrinsiclaw.com



# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

## PCT

To:  
IBRAHIM M. HALLAJ  
INTRINSIC LAW CORP  
1344 MAIN STREET  
WALTHAM, MA 02451

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference	Date of mailing (day/month/year)
International application No. PCT/IB 13/03043	International filing date (day/month/year) 07 October 2013 (07.10.2013)
Applicant MARGALIT, MORDEHAI	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

**Where?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

**For more detailed instructions,** see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices;

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders:**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

For details about the applicable time limits, Office by Office, see [www.wipo.int/pct/en/texts/time\\_limits.html](http://www.wipo.int/pct/en/texts/time_limits.html) and the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer  Lee W. Young  PCT Helpdesk: 571-273-4300 Telephone No. PCT OSP: 571-273-7774
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Form PCT/ISA/220 (July 2010)

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

IBRAHIM M. HALLAJ  
INTRINSIC LAW CORP  
1344 MAIN STREET  
WALTHAM, MA 02451

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year)	18 AUG 2014
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Applicant's or agent's file reference	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/IB 13/03043	International filing date (day/month/year) 07 October 2013 (07.10.2013)
Applicant MARGALIT, MORDEHAI	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

## Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

**Where?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ With regard to any protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

## 4. Reminders

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months.

For details about the applicable time limits, Office by Office, see [www.wipo.int/pct/en/texts/time\\_limits.html](http://www.wipo.int/pct/en/texts/time_limits.html) and the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer  Lee W. Young PCT Helpdesk: 571-272-4350 Telephone No. PCT OSP: 571-272-7771
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Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	<b>FOR FURTHER ACTION</b> <span style="float: right;">see Form PCT/ISA/220 as well as, where applicable, item 5 below</span>	
International application No. PCT/IB 13/03043	International filing date (day/month/year) 07 October 2013 (07.10.2013)	(Earliest) Priority Date (day/month/year) 05 October 2012 (05.10.2012)
Applicant MARGALIT, MORDEHAI		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.  
☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.  
☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the **title**:

☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.  
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the drawings to be published with the abstract is Figure No. 12

☒ as suggested by the applicant.  
☐ as selected by this Authority, because the applicant failed to suggest a figure.  
☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 13/03043

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H01L 33/00 (2014.01)

USPC - 257/79

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC - 257/79

IPC(8) - H01L 33/00 (2014.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC: 362/611, 512; 257/79, 99; 438/106 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase; PubWEST; Google

Search Terms Used: LED, light emitting diode, carrier, wafer, thermally conducting, heat sink, reflective, transparent, transmissive, trench, relief, hole, via, intrinsic, dielectric stack, diffusion, adhesive

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0276885 A1 (TAIN et al.) 14 December 2006 (14.12.2006), entire document especially Fig 2E, paras [0023]-[0025]	1-20
Y	US 2012/0223351 A1 (MARGALIT) 06 September 2012 (06.09.2012), entire document especially Figs 3, 9; paras [0006], [0029], [0039], [0044]	1-10
Y	WO 2011/033516 A1 (MARGALIT et al.) 24 March 2011 (24.03.2011), entire document especially Figs 4B, 5; paras [0009], [0028], [0030], [0047]	4, 8, 11-20
Y	US 2006/0092532 A1 (OUDERKIRK) 04 May 2006 (04.05.2006), entire document especially para [0020]	3
Y	US 2010/0068421 A1 (TSE et al.) 18 March 2010 (18.03.2010), entire document especially Abstract	6, 20
Y	US 2006/0163683 A1 (ROTH et al.) 27 July 2006 (27.07.2006), entire document especially para [0120]	6
Y	US 2011/0309382 A1 (LOWGREN) 22 December 2011 (22.12.2011), entire document especially para [0096]	10, 16

☐ Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

16 May 2014 (15.05.2014)

Date of mailing of the international search report

18 AUG 2014

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3261

Authorized officer:

Lee W. Young

PCT Helpdesk: 877-272-4360

PCT OSP: 877-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: IBRAHIM M. HALLAJ  
INTRINSIC LAW CORP  
1344 MAIN STREET  
WALTHAM, MA 02451

Date of mailing  
(day/month/year)

18 AUG 2014

Applicant's or agent's file reference

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/IB 13/03043

International filing date (day/month/year)

07 October 2013 (07.10.2013)

Priority date (day/month/year)

05 October 2012 (05.10.2012)

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - H01L 33/00 (2014.01)

USPC - 257/79

Applicant MARGALIT, MORDEHAI

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

## 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-3201

Date of completion of this opinion

15 May 2014 (15.05.2014)

Authorized officer:

Lee W. Young

PCT Helpdesk: 877-475-4500  
PCT DSR: 571-273-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/IB 13/63043

Box No. 1 Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
- a. (means)
- ☐ on paper
- ☐ in electronic form
- b. (time)
- ☐ in the international application as filed
- ☐ together with the international application in electronic form
- ☐ subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/IB 13/03043

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement			
<b>1. Statement</b>				
Novelty (N)	Claims	1-20	YES	
	Claims	NONE	NO	
Inventive step (IS)	Claims	NONE	YES	
	Claims	1-20	NO	
Industrial applicability (IA)	Claims	1-20	YES	
	Claims	NONE	NO	
<b>2. Citations and explanations:</b>				
<p>Claims 1, 2, 7 and 9 lack an inventive step under PCT Article 33(3) as being obvious over US 2006/0276665 A1 to TAIN et al. (hereinafter Tain) in view of US 2012/0223351 A1 to MARGALIT (hereinafter Margalit'351).</p> <p>Claim 1: Tain discloses a light emitting device (Abstract), comprising: a carrier wafer (110), wherein a substantial amount of carrier wafer is removed to create a relief (111) (Fig 2E; paras [0023]-[0024]); a semiconductor LED (118), said semiconductor LED is affixed to said carrier wafer proximate to said relief (para [0025]), and a thermally conductive layer (112) disposed adjacent to said semiconductor LED in said relief (para [0023]). Tain does not specifically disclose that the LED includes doped and intrinsic regions thereof, at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer, or a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components. However, Margalit'351 discloses that the LED (300, 900) includes doped and intrinsic regions thereof (Fig 3; para [0029]); at least one optically reflective surface (970) disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer (Fig 9; para [0044]); a substantially optically transmissive layer (530, 930) proximal to said semiconductor LED covering at least a portion of the above components (para [0035]). It would have been obvious to a person skilled in the art to modify the device of Tain in accordance with the teachings of Margalit'351 such that the LED includes doped and intrinsic regions thereof, so as to include at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer, and so as to include a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components, since it would provide the desired electrical and optical characteristics (see Margalit'351 para [0008]).</p> <p>Claim 2: Tain in view of Margalit'351 discloses the device of Claim 1. Margalit'351 further discloses that at least one optically reflective surface comprising metal (para [0032]).</p> <p>Claim 7: Tain in view of Margalit'351 discloses the device of Claim 1. Margalit'351 further discloses that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical transmissivity (para [0010]).</p> <p>Claim 9: Tain in view of Margalit'351 discloses the device of Claim 1. Tain further discloses that said thermally conductive layer comprises metal (para [0023]).</p> <p>Claims 11-15 and 17-19 lack an inventive step under PCT Article 33(3) as being obvious over Tain in view of WO 2011/033516 A1 to MARGALIT et al. (hereinafter Margalit'516).</p> <p>Claim 11: Tain discloses a method for making light emitting device comprising the steps of: forming a carrier wafer (110) (Fig 2E; paras [0023]); forming a light emitting device (LED) (118) disposed on an optically permissive layer (para [0025]); forming a recess (111) in said carrier wafer proximate to said LED (Fig 2E; para [0023]); and filling said recess with a thermally conductive material (112) (para [0023]). However, Tain does not specifically disclose a plurality of doped layers in the LED; using an optically permissive adhesive to mechanically secure said LED onto said carrier wafer; forming spacers on said carrier wafer proximate to said LED; or metalizing at least a portion of said spacers. Margalit'516 discloses a plurality of doped layers in the LED (para [0041]); using an optically permissive adhesive (para [0047]); forming spacers on said carrier wafer proximate to said LED (Figs 4B, 5; para [0009]); and metalizing at least a portion of said spacers (Figs 4B, 5; para [0009]). It would have been obvious to a person skilled in the art to modify the method of Tain in accordance with the teachings of Margalit'516 so as to include a plurality of doped layers in the LED; using an optically permissive adhesive to mechanically secure said LED onto said carrier wafer; forming spacers on said carrier wafer proximate to said LED; and metalizing at least a portion of said spacers, since it would provide the desired electrical and optical characteristics.</p> <p>Claim 12: Tain in view of Margalit'516 discloses the method of Claim 11. Margalit'516 further discloses encapsulating said LED with an optically permissive material and mechanically securing an optically transmissive cover substrate (paras [0026], [0030]).</p> <p>Claim 13: Tain in view of Margalit'516 discloses the method of Claim 12. Margalit'516 further discloses suspending photoluminescent particles in the optically permissive material (para [0028]).</p> <p>Claim 14: Tain in view of Margalit'516 discloses the method of Claim 12. Margalit'516 further discloses suspending quantum dot particles in the optically permissive material (para [0030]).</p> <p style="text-align: center;">-- Please See Continuation Sheet --</p>				

Form PCT/ISA/237 (Box No. VI) (July 2011)

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/AB 13/03043

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of  
Box V. 2. Citations and explanations:

Claim 15: Tain in view of Margalit'516 discloses the method of Claim 11. Tain further discloses that the thermally conductive material comprises metal (para [0023]).

Claim 17: Tain in view of Margalit'516 discloses the method of Claim 11. Tain further discloses that the thermally conductive material comprises metal (para [0023]).

Claim 18: Tain in view of Margalit'516 discloses the method of Claim 11. Margalit'516 further discloses that the optically permissive adhesive has the property of high thermal conductivity (para [0042]).

Claim 19: Tain in view of Margalit'516 discloses the method of Claim 11. Margalit'516 further discloses that the optically permissive adhesive has the property of high thermal conductivity (para [0042]).

Claim 3 lacks an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalit'351 and further in view of US 2006/0092532 A1 (OUDERKIRK).

Claim 3: Tain in view of Margalit'351 discloses the device of Claim 1, but does not specifically disclose at least one optically reflective surface comprising a dielectric stack. Ouderkirk discloses an LED wherein at least one optically reflective surface comprises a dielectric stack (para [0021]). It would have been obvious to a person skilled in the art to further modify the device of Tain in accordance with the teachings of Ouderkirk such that at least one optically reflective surface comprises a dielectric stack, since it would provide enhanced reflectivity (see Ouderkirk para [0020]).

Claims 4 and 8 lack an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalit'351 and further in view of Margalit'516.

Claim 4: Tain in view of Margalit'351 discloses the device of Claim 1, but does not specifically disclose that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity. Margalit'516 discloses bonding an LED to a wafer using a thermally conductive adhesive (para [0042]). It would have been obvious to a person skilled in the art to further modify the device of Tain in accordance with the teachings of Margalit'516 such that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity, since it would provide enhanced heat removal from the LED.

Claim 8: Tain in view of Margalit'351 discloses the device of Claim 1, but does not specifically disclose at least one spacer attached to said carrier wafer, whereby, said at least one optically reflective surface is affixed thereto. Margalit'516 discloses at least one spacer attached to said carrier wafer, whereby, said at least one optically reflective surface is affixed thereto (Figs 4B, 5; para [0009]). It would have been obvious to a person skilled in the art to further modify the device of Tain in accordance with the teachings of Margalit'516 such that said spacer is attached to said carrier wafer, whereby, said at least one optically reflective surface is affixed thereto, to provide secure attachment of the reflective surface.

Claim 5 lacks an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalit'351 and further in view of US 2010/0068421 A1 to TSE et al. (hereinafter Tse).

Claim 5: Tain in view of Margalit'351 discloses the device of Claim 1, but does not specifically disclose that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion. Tse discloses affixing LEDs with an adhesive material which has the property of optical diffusion (Abstract). It would have been obvious to a person skilled in the art to further modify the device of Tain in accordance with the teachings of Tse such that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion, since it would provide diffuse light.

Claim 6 lacks an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalit'351 and further in view of US 2006/0153683 A1 to ROTH et al. (hereinafter Roth).

Claim 6: Tain in view of Margalit'351 discloses the device of Claim 1, but does not specifically disclose that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical reflection. Roth discloses affixing LEDs with an adhesive material which has the property of optical reflection (para [0120]). It would have been obvious to a person skilled in the art to further modify the device of Tain in accordance with the teachings of Roth such that said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical reflection, since it would increase the light output from the device.

Claim 10 lacks an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalit'351 and further in view of US 2011/0309382 A1 (LOWGREN).

Claim 10: Tain in view of Margalit'351 discloses the device of Claim 1, but does not specifically disclose that said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity. Lowgren discloses that said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity (para [0096], epoxy). It would have been obvious to a person skilled in the art to further modify the device of Tain in accordance with the teachings of Lowgren such that said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity, since it would be an effective means of removing heat from the device.

-- Please See Continuation Sheet --



WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/IB 12/03043

Supplemental Box

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Box V. 2. Citations and explanations:

Claim 16 lacks an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalič516 and further in view of Lowgren.

Claim 16: Tain in view of Margalič516 discloses the method of Claim 11, but does not specifically disclose that the thermally conductive material comprises an organic compound with high thermal conductivity. Lowgren discloses that the thermally conductive material comprises an organic compound with high thermal conductivity (para [0096], epoxy). It would have been obvious to a person skilled in the art to further modify the method of Tain in accordance with the teachings of Lowgren such that the thermally conductive material comprises an organic compound with high thermal conductivity, since it would be an effective means of removing heat from the device.

Claim 20 lacks an inventive step under PCT Article 33(3) as being obvious over Tain in view of Margalič516 and further in view of Tse.

Claim 20: Tain in view of Margalič516 discloses the method of Claim 11, but does not specifically disclose that the optically permissive adhesive has the property of optical diffusion. Tse discloses affixing LEDs with an adhesive material which has the property of optical diffusion (Abstract). It would have been obvious to a person skilled in the art to further modify the method of Tain in accordance with the teachings of Tse such that the optically permissive adhesive has the property of optical diffusion, since it would provide diffuse light.

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		14047715		
<b>Filing Date:</b>		07-Oct-2013		
<b>Title of Invention:</b>		Light Emitting Diode Package with Enhanced Heat Conduction		
<b>First Named Inventor/Applicant Name:</b>		Mordehai Margalit		
<b>Filer:</b>		Ibrahim M. Hallaj/Jessica Lecesse		
<b>Attorney Docket Number:</b>		VIA.USCIP.0110		
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
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<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	2806	1	90	90
<b>Total in USD (\$)</b>				<b>90</b>

<b>Electronic Acknowledgement Receipt</b>	
<b>EFS ID:</b>	20055042
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	05-SEP-2014
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	11:03:22
<b>Application Type:</b>	Utility under 35 USC 111(a)

### **Payment information:**

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 90
RAM confirmation Number	8735
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	VIA_USCIP_0110_Supp_IDS.pdf	612418 454856d92dc9bfd58b6017b0e2ebd9509ac2f5e3	no	4
<b>Warnings:</b>					
<b>Information:</b>					
2	Transmittal Letter	VIA_USCIP_0110_IDS_State ment.pdf	50783 4d2c94aae5507e0039df1d6f55d172d19420cdd	no	2
<b>Warnings:</b>					
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3	Non Patent Literature	NPL_ISR.pdf	1748992 c16802c26d158101bc7d0af7738851a6d571cd4d	no	9
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4	Fee Worksheet (SB06)	fee-info.pdf	30299 8109920c493288b16f55c9e6868e9ad91682669e	no	2
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		14047715	
	Filing Date		2013-10-07	
	First Named Inventor	Mordehai Margalit		
	Art Unit	2891		
	Examiner Name	David A. ZARNEKE		
	Attorney Docket Number	VIA.USCIP.0110		

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	1	7910940	B2	2011-03-22	Koike et al.		
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	2	20090291518	A1	2009-11-26	Kim et al.		
	3	20030006418	A1	2003-01-09	Emerson et al.		
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	Filing Date		2013-10-07	
	First Named Inventor	Mordehai Margalit		
	Art Unit	2891		
	Examiner Name	David A. ZARNEKE		
	Attorney Docket Number	VIA.USCIP.0110		

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> i	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	14047715
	Filing Date	2013-10-07
	First Named Inventor	Mordehai Margalit
	Art Unit	2891
	Examiner Name	David A. ZARNEKE
	Attorney Docket Number	VIA.USCIP.0110

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Ibrahim M. Hallaj/	Date (YYYY-MM-DD)	2014-06-20
Name/Print	Ibrahim M. Hallaj	Registration Number	51768

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		14047715		
<b>Filing Date:</b>		07-Oct-2013		
<b>Title of Invention:</b>		Light Emitting Diode Package with Enhanced Heat Conduction		
<b>First Named Inventor/Applicant Name:</b>		Mordehai Margalit		
<b>Filer:</b>		Ibrahim M. Hallaj/Jessica Lecesse		
<b>Attorney Docket Number:</b>		VIA.USCIP.0110		
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	2806	1	90	90
<b>Total in USD (\$)</b>				<b>90</b>

Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	19363418
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	20-JUN-2014
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	12:31:54
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 90
RAM confirmation Number	9985
Deposit Account	505153
Authorized User	HALLAJ, IBRAHIM M
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	VIA_USCIP_0110_IDS_State- ment.pdf	59396	no	2
			5b8677156b1dfb620e3c4f45d90a02654fabf5dc4		

### Warnings:

### Information:

2	Information Disclosure Statement (IDS) Form (SB08)	VIA_USCIP_0110_Supp_IDS.pdf	612359	no	4
			a48f0826df8de082db99717a990ff3c02ecab6eb		

### Warnings:

### Information:

3	Fee Worksheet (SB06)	fee-info.pdf	30299	no	2
			f93c8dcd96604e32356474007916597ffcd9d0ee8		

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<b>Total Files Size (in bytes):</b>	702054
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### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

### National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application No.	14/047,715
First-Named Inventor	Mordehai Margalit
Filing Date	Oct. 7, 2013
Examiner	David A. ZARNEKE
Art Unit	2891
For	"LIGHT EMITTING DIODE PACKAGE WITH ENHANCED HEAT CONDUCTION"
Attorney Docket No.	VIA.USCIP.0110
Customer No.	93255

June 20, 2014

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**STATEMENT FILED PURSUANT TO THE DUTY OF DISCLOSURE**

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, the Applicant(s) request consideration of this Supplemental Information Disclosure Statement. The Applicant(s) hereby make the following information of record in the above-identified application.

The Applicant(s) would like to bring to the Examiner's attention the following co-pending applications that may contain subject matter related to this application:

13/424,875                      "Wafer Level Packaging of Electronic Devices"

By submitting this Supplemental Information Disclosure Statement, the Applicant(s) make no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

By submitting this Supplemental Information Disclosure Statement, the Applicant(s) make no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R §1.56(b).

By submitting this Supplemental Information Disclosure Statement, the Applicant(s) make no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. §102.

Notwithstanding any statements by the Applicant(s), the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

If any fees are required in this matter that have not been paid along with this Statement, the Office is kindly requested and authorized to charge such fees to USPTO Deposit Account No. 505153.

Respectfully,

/Ibrahim M. Hallaj/

---

Ibrahim M. Hallaj, Esq.  
Attorney for Applicant  
Reg. No. 51,768  
Intrinsic Law Corp.  
760 Main Street, Third Floor  
Waltham, MA, 02451  
1.617.420.0078  
**USPTO Cust. No. 93255**  
docketing@intrinsiclaw.com



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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P.O. Box 1450  
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/047,715	10/07/2013	Mordehai Margalit	VIA.USCIP.0110

**CONFIRMATION NO. 6858**

## PUBLICATION NOTICE



\*OC00000066621215\*

93255  
Intrinsic Law Corp.  
1344 Main Street  
Waltham, MA 02451

**Title:**Light Emitting Diode Package with Enhanced Heat Conduction

**Publication No.**US-2014-0042479-A1

**Publication Date:**02/13/2014

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at [www.uspto.gov](http://www.uspto.gov). The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at [www.uspto.gov](http://www.uspto.gov) using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



# DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction
--------------------	--

As the below named inventor, I hereby declare that:

This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number 14/047,715 filed on 10/07/2013.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

## WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

## LEGAL NAME OF INVENTOR

Inventor: Mordehai Margalit Date (Optional): 11-27-13

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	17525687
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	27-NOV-2013
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	15:57:30
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	VIA_USCIP_0110_Dec_signed.pdf	1234425 8a9c96ff6ee2456ad2d7128b31ec832d06e d6647	no	1

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**New Applications Under 35 U.S.C. 111**

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**New International Application Filed with the USPTO as a Receiving Office**

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		14047715
	Filing Date		2013-10-07
	First Named Inventor	Mordehai Margalit	
	Art Unit	2891	
	Examiner Name	N/A	
	Attorney Docket Number	VIA.USCIP.0110	

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6501091		2002-12-31	Bawendi	
	2	7232754		2007-06-19	Kirby et al.	
	3	7951625		2011-05-31	Kamei	
	4	8278213		2012-10-02	Kameyama et al.	
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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100207145		2010-08-19	Yoo	
	2	20060006404		2006-01-12	Ibbetson et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		14047715
	Filing Date		2013-10-07
	First Named Inventor	Mordehai Margalit	
	Art Unit	2891	
	Examiner Name	N/A	
	Attorney Docket Number	VIA.USCIP.0110	

	3	20090173958		2009-07-09	Chakraborty et al.	
	4	20060284321		2006-12-21	Wu et al.	
	5	20100053929		2010-03-04	Bisberg	
	6	20060011935		2006-01-19	Krames	
	7	20080068845		2008-03-20	Aida et al.	
	8	20100148193		2010-06-17	Duong et al.	
	9	20060081869		2006-04-20	Lu et al.	
	10	20050017258		2005-01-27	Fehrer et al.	
	11	20090267096		2009-10-29	Kim	
	12	20110006322		2011-01-13	Li et al.	
	13	20090273002		2009-11-05	Chiou et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		14047715	
	Filing Date		2013-10-07	
	First Named Inventor	Mordehai Margalit		
	Art Unit	2891		
	Examiner Name	N/A		
	Attorney Docket Number	VIA.USCIP.0110		

	14	20090108283		2009-04-30	Kadotani et al.	
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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

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Examiner Signature		Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	14047715
	Filing Date	2013-10-07
	First Named Inventor	Mordehai Margalit
	Art Unit	2891
	Examiner Name	N/A
	Attorney Docket Number	VIA.USCIP.0110

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Ibrahim M. Hallaj/	Date (YYYY-MM-DD)	2013-11-22
Name/Print	Ibrahim M. Hallaj	Registration Number	51768

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		14047715		
<b>Filing Date:</b>		07-Oct-2013		
<b>Title of Invention:</b>		Light Emitting Diode Package with Enhanced Heat Conduction		
<b>First Named Inventor/Applicant Name:</b>		Mordehai Margalit		
<b>Filer:</b>		Ibrahim M. Hallaj/Jessica Lecesse		
<b>Attorney Docket Number:</b>		VIA.USCIP.0110		
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	2806	1	90	90
<b>Total in USD (\$)</b>				<b>90</b>

<b>Electronic Acknowledgement Receipt</b>	
<b>EFS ID:</b>	17482077
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	22-NOV-2013
<b>Filing Date:</b>	07-OCT-2013
<b>Time Stamp:</b>	15:53:15
<b>Application Type:</b>	Utility under 35 USC 111(a)

### **Payment information:**

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 90
RAM confirmation Number	2968
Deposit Account	505153
Authorized User	HALLAJ, IBRAHIM M
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	VIA_USCIP_0110_IDS.pdf	612839	no	5
			f9621ab538cf1a9b08ed52c41b801d34cecf055d		

### Warnings:

### Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30299	no	2
			38a222963d3ba27447169da0549c1c8efbbe185f		

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

#### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/047,715	10/07/2013	Mordehai Margalit	VIA.USCIP.0110

**CONFIRMATION NO. 6858**

93255  
Intrinsic Law Corp.  
1344 Main Street  
Waltham, MA 02451

## NOTICE



Date Mailed: 11/07/2013

## INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):  
Mordehai Margalit

Applicant may submit the inventor's oath or declaration at any time before the Notice of Allowance and Fee(s) Due, PTOL-85, is mailed.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875						Application or Docket Number 14/047,715			
<b>APPLICATION AS FILED - PART I</b>									
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	300		N/A			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A			
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *	x 40 =	0.00	OR				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	minus 3 = *	x 210 =	0.00	OR				
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00					
			TOTAL	730	TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.									
<b>APPLICATION AS AMENDED - PART II</b>									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	x	=	OR	x	=	
	Independent (37 CFR 1.16(h))	*	Minus ***	x	=	OR	x	=	
	Application Size Fee (37 CFR 1.16(s))					OR			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR			
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	x	=	OR	x	=	
	Independent (37 CFR 1.16(h))	*	Minus ***	x	=	OR	x	=	
	Application Size Fee (37 CFR 1.16(s))					OR			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR			
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.									



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/047,715	10/07/2013	2811	800	VIA.USCIP.0110	20	2

CONFIRMATION NO. 6858

93255

Intrinsic Law Corp.  
1344 Main Street  
Waltham, MA 02451

## FILING RECEIPT



\*0C000000064854544\*

Date Mailed: 11/07/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

### Inventor(s)

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

### Applicant(s)

Mordehai Margalit, Zichron Yaaqov, ISRAEL;

Power of Attorney: None

### Domestic Priority data as claimed by applicant

This application is a CIP of 13/424,875 03/20/2012  
and claims benefit of 61/710,156 10/05/2012

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)  
ISRAEL PCT/IL2010/000772 09/20/2010

**If Required, Foreign Filing License Granted:** 11/06/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/047,715**

**Projected Publication Date:** 02/13/2014

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

Light Emitting Diode Package with Enhanced Heat Conduction

**Preliminary Class**

257

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).



**LICENSE FOR FOREIGN FILING UNDER**  
**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

<b>UTILITY PATENT APPLICATION TRANSMITTAL</b>  <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	<i>Attorney Docket No.</i>	VIA.USCIP.0110
	<i>First Named Inventor</i>	Mordehai Margalit
	<i>Title</i>	Light Emitting Diode Package with Enhanced Heat Conduction
	<i>Express Mail Label No.</i>	

<b>APPLICATION ELEMENTS</b> <i>See MPEP chapter 600 concerning utility patent application contents.</i>	<b>Commissioner for Patents</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>
1. <input checked="" type="checkbox"/> <b>Fee Transmittal Form</b> (PTO/SB/17 or equivalent) 2. <input checked="" type="checkbox"/> <b>Applicant asserts small entity status.</b> See 37 CFR 1.27 3. <input type="checkbox"/> <b>Applicant certifies micro entity status.</b> See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>24</u> ] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>12</u> ] 6. <b>Inventor's Oath or Declaration</b> [Total Pages _____] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. <input type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> A copy from a prior application (37 CFR 1.63(d)) 7. <input checked="" type="checkbox"/> <b>Application Data Sheet</b> * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. <b>CD-ROM or CD-R</b> in duplicate, large table, or Computer Program (Appendix) <input type="checkbox"/> Landscape Table on CD 9. <b>Nucleotide and/or Amino Acid Sequence Submission</b> (if applicable, items a. – c. are required) a. <input type="checkbox"/> Computer Readable Form (CRF) b. <input type="checkbox"/> Specification Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper c. <input type="checkbox"/> Statements verifying identity of above copies	<b>ACCOMPANYING APPLICATION PAPERS</b> 10. <input type="checkbox"/> <b>Assignment Papers</b> (cover sheet & document(s)) Name of Assignee _____ 11. <input type="checkbox"/> <b>37 CFR 3.73(c) Statement</b> <input type="checkbox"/> <b>Power of Attorney</b> (when there is an assignee) 12. <input type="checkbox"/> <b>English Translation Document</b> (if applicable) 13. <input type="checkbox"/> <b>Information Disclosure Statement</b> (PTO/SB/08 or PTO-1449) <input type="checkbox"/> Copies of citations attached 14. <input type="checkbox"/> <b>Preliminary Amendment</b> 15. <input type="checkbox"/> <b>Return Receipt Postcard</b> (MPEP § 503) (Should be specifically itemized) 16. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b> (if foreign priority is claimed) 17. <input type="checkbox"/> <b>Nonpublication Request</b> Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. <input type="checkbox"/> <b>Other:</b> _____ _____ _____ _____ _____

**\*Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).  
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

<b>19. CORRESPONDENCE ADDRESS</b>					
<input checked="" type="checkbox"/> The address associated with Customer Number: <u>93255</u> OR <input type="checkbox"/> Correspondence address below					
Name					
Address					
City	State	Zip Code			
Country	Telephone	Email			
Signature	/Ibrahim M. Hallaj/			Date	2013-10-07
Name (Print/Type)	Ibrahim M. Hallaj			Registration No. (Attorney/Agent)	51768

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

**Secrecy Order 37 CFR 5.2**

<input type="checkbox"/>	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

**Inventor Information:**

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Mordehai		Margalit		
Residence Information (Select One) <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
City	Zichron Yaaqov	Country of Residence i	IL		
Mailing Address of Inventor:					
Address 1		21 Hashita St.			
Address 2					
City	Zichron Yaaqov	State/Province			
Postal Code	30900	Country i	IL		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					
Add					

**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.			
Customer Number	93255		
Email Address	docketing@intrinsiclawn.com	Add Email	Remove Email

**Application Information:**

Title of the Invention	Light Emitting Diode Package with Enhanced Heat Conduction		
Attorney Docket Number	OCT.USCIP.0110	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	12	Suggested Figure for Publication (if any)	12

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		

**Publication Information:**

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	<b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	93255		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.			
Prior Application Status	Pending	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	13424875	2012-03-20
Prior Application Status	Pending	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61710156	2012-10-05
Prior Application Status	Expired	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61244046	2009-09-20
Prior Application Status	Expired	<a href="#">Remove</a>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61351875	2010-06-05
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.			<a href="#">Add</a>

**Foreign Priority Information:**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) <sup>i</sup>the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

<a href="#">Remove</a>			
Application Number	Country <sup>i</sup>	Filing Date (YYYY-MM-DD)	Access Code <sup>j</sup> (if applicable)
PCT/IL2010/000772	WO	2010-09-20	
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<a href="#">Add</a>

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

<p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p><input type="checkbox"/> NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
--

## Authorization to Permit Access:

<input type="checkbox"/> Authorization to Permit Access to the Instant Application by the Participating Offices
---

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	OCT.USCIP.0110
		Application Number	
Title of Invention	Light Emitting Diode Package with Enhanced Heat Conduction		

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**LIGHT EMITTING DIODE PACKAGE WITH ENHANCED HEAT CONDUCTION****Related Applications**

**[0001]** This application is related to and claims the benefit and priority of U.S. Provisional Application No. 61/710,156 entitled, "Light Emitting Diode Package with Enhanced Heat Conduction" filed on Oct. 5, 2012, which is hereby incorporated by reference. This application is also a continuation in part of U.S. Appl. 13/424,875 having the same title, claiming the benefit and priority of U.S. Provisional Application Nos. 61/244,046, filed on September 20, 2009, and 61/351,875, filed on June 5, 2010, as well as to PCT Application Number PCT/IL2010/000772, filed September 20, 2010.

**Technical Field**

**[0002]** The present application is directed to a light emitting diode (LED) device implemented on a wafer substrate layer and permits efficient thermal conductivity properties and repeatable manufacture of the same and can be used in FET, RF and power transistor applications.

**Background**

**[0003]** A light emitting diode (LED) is a semiconductor device that is configured to receive electrical power to stimulate an output of electromagnetic radiation commonly in the visible range of the spectrum (light). Portions of a LED comprise doped semiconductor materials that operate to combine charge in a way that releases light energy from the body of the LED material. While the irradiance depends on the operating conditions of the LED, the wavelength of the light

energy is determined by the band gap of the semiconductor materials, in addition to external interaction with various active optical covers and encapsulants.

**[0004]** Packaging of electronic devices, such as light emitting diodes (LEDs) and other devices, represent a major cost in the production of electronic parts. In one non-limiting example, LEDs which offer long lifetime, compact form factor, superior energy efficiency, and RohS compliancy are expensive due to the packaging requirements which include sealing, optics, phosphor and efficient heat conduction. There have been numerous efforts to reduce the cost of the electronic device packaging by using silicon based wafer level assembly technologies. However, these approaches still require a carrier chip for the electronic device and in most cases the carrier chip doubles the cost, and in the case of an LED triples the heat resistivity.

**[0005]** Specifically, when electrical current is passed through a LED (i.e., switched on), carrier electrons recombine with holes within the device releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LEDs are often small in radiative area (less than 1 mm<sup>2</sup>). Integrated optical components may be used to shape or change its radiation pattern.

**[0006]** A LED package can also incorporate and perform optical functions. For example, a LED package can include optical materials and/or structures, such as lenses, diffusors, light scattering layers, etc., that can direct light output by the semiconductor chip in a desired manner. These are typically bonded to the transmission face of the LED.

**[0007]** Light emitting devices generally include a semiconductor chip, or die, including a p-n junction formed upon an epitaxial layer grown on a substrate, such as, sapphire, silicon, silicon carbide, or gallium arsenide. The substrate may subsequently be trimmed, patterned, or removed altogether. In addition to

phosphor luminescent transitions, the wavelength distribution of the light generated by the LED depends on the material from which the p-n junction is fabricated and the structure of the thin epitaxial layers that make up the active region of the device.

**[0008]** The p-n junction semiconductor die is typically enclosed in a package. A LED package can perform a number of functions and provide a number of benefits. For example, a LED package can provide mechanical support and environmental protection for the semiconductor die, as well as providing electrical leads for connecting the die to an external circuit, and heat sinks for efficient heat extraction from the chip.

**[0009]** It is often desirable to incorporate phosphor into a solid state light emitting device package to enhance the emitted radiation in a particular frequency band and/or to convert at least some of the radiation to another frequency band. Depending on the application, phosphorescent coatings and/or suspensions are often used to broaden the bandwidth of the emitted light. Phosphors absorb some of the photons emitted from the LED and temporarily stores its energy before releasing it in another wavelength photon.

**[0010]** In general, phosphors absorb light having shorter wavelengths and re-emit light having longer wavelengths. As such, some or all of the light emitted by the LED chip at a first wavelength may be absorbed by the phosphor particles, which may responsively emit light at a second wavelength. For example, a single blue emitting LED chip may be surrounded with a yellow phosphor, such as cerium-doped yttrium aluminum garnet (YAG). The resulting light, which is a combination of blue light and yellow light, may appear white to an observer. Photo luminescent events, in which a chemical substrate absorbs and then re-emits a photon of light, are fast, on the order of 10 nanoseconds. Light is absorbed and emitted at these fast time scales in cases where the energy of the photons involved matches the available energy states and allowed transitions of the substrate.

**[0011]** Light-emitting diodes are used in applications as diverse as aviation lighting, automotive lighting, advertising, general lighting, and traffic signals. LEDs have allowed new text, video displays, and sensors to be developed, while their high switching rates are also useful in advanced communications technology. LEDs are used as indicator lamps in many devices and are increasingly used for general lighting. Appearing as practical electronic components in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet, and infrared wavelengths, with very high brightness.

**[0012]** LEDs have many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. However, LEDs powerful enough for room lighting are relatively expensive, and require more precise current and heat management than compact fluorescent lamp sources of comparable output.

**[0013]** LEDs compare favorably to other sources of light and are especially useful in certain applications and markets. For example, LED lighting generally provides advantages with respect to energy efficiency, compact, rugged, long-lasting design and form factor, as well as other features. LED lighting compares favorably with other sources in the amount of light energy generated in the visible electromagnetic spectrum compared to the infra-red or heat energy wasted by the light source. In addition, LED lights include fewer environmentally damaging components when compared to other light forms, and therefore provide better compliance with restrictions on hazardous substances (RohS) regulations.

**[0014]** That said, conventional LED devices can be relatively costly to manufacture by some metrics when compared to other light sources. One reason for this is the exacting packaging requirements for manufacturing LEDs. LED packaging calls for proper clean conditions, micro-fabrication facilities similar to other semiconductor manufacturing operations, sealing requirements, optical requirements, the use of phosphor in LED applications, as well as packaging that is designed to efficiently handle the conduction of heat generated in the devices.

**[0015]** Efforts have been made to reduce the cost of conventional LED packaging which uses silicon (Si) or ceramic based carrier substrates. LEDs mounted on an individual chip scale carrier substrate are more expensive to process.

Alternatively, LEDs are mounted on a carrier wafer, where the packaging process is done on many LEDs in parallel and the packaged LEDs are singulated at the end of the packaging process, results in a lower cost for the packaged LEDs. The wafer based approach is termed wafer level assembly packaging (WLP).

**[0016]** Wafer-level packaging consists of extending the wafer fab processes to include device interconnection and device protection processes. Other types of packaging performs wafer dicing first and places the individual die in a plastic package followed by attaching the solder bumps. Wafer-level packaging involves attaching the top and bottom outer layers of packaging, and the solder bumps, to integrated circuit while still in the wafer, and then wafer dicing.

**[0017]** However, these conventional techniques still require the use of a carrier substrate to support the LED, which can double the cost of making and packaging the LED device. In addition, the carrier substrate greatly increases the thermal resistivity of the device and adversely affects its heat removal characteristics. Hence it is desirable to provide a wafer level package for LEDs which does not require any carrier substrate and uses the LED die only, alternatively, the package provides a direct thermal connection from the LED to the heat sink for efficient removal of the generated heat. Accordingly, there is a need for LED devices that do not suffer from some or all of the above problems.

### **Summary**

**[0018]** As mentioned above, the present inventions related to new and improved methods and apparatus for providing a light emitting diode package which efficiently removes heat and reflects optical energy away from a carrier wafer. Specifically, an improved LED in a wafer level processed (WLP) package is

disclosed using vias in the silicon to route the electrical connections to the LED backside and a dedicated hole in the silicon with a direct heat conduction route from the LED to the printed circuit board.

**[0019]** In some aspects, the present apparatus provides a light emitting device comprising a carrier wafer with an etched recess and a semiconductor LED including doped and intrinsic regions thereof. The semiconductor LED is affixed to said carrier wafer proximate to the recess, and a thermally conductive layer disposed adjacent to the semiconductor LED in the recess. In some aspects, optical reflectors are disposed on spacers on the carrier wafer. In other aspects, a substantially optically transmissive layer covers the semiconductor LED.

**[0020]** In yet other aspects, said at least one optically reflective surface comprises metal or a dielectric stack. In another aspect, the semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity. In other aspects, the semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion, transmission, reflection, or combination thereof. In another aspect, the thermally conductive layer comprises metal or an organic material with a physical property of high thermal conductivity.

### **In the Drawings**

**[0021]** Fig. 1 represents the state of the art GaN LED chip;

**[0022]** Fig. 2 depicts an exemplary LED die with a reflective layer in a horizontal construction;

**[0023]** Fig. 3 illustrates an exemplary flip-chip method of LED manufacturing in preparation of wafer level processing;

**[0024]** Fig. 4 portrays an exemplary LED package with silicone encapsulated peripheral reflectors;



- [0025]** Fig. 5 illustrates an exemplary etching view during wafer processing;
- [0026]** Fig. 6 depicts an exemplary orthogonal view of the wafer after etching vias and thermal conduction pad;
- [0027]** Fig. 7 illustrates an exemplary profile view during wafer processing showing masking placements;
- [0028]** Fig. 8 illustrates an exemplary method of passivation layer disposition;
- [0029]** Fig. 9 illustrates an exemplary wafer with metal patterned thereto;
- [0030]** Fig. 10 demonstrates an exemplary orthogonal view of the wafer with metal patterned thereto;
- [0031]** Fig. 11 demonstrates an exemplary orthogonal view of the wafer showing solder masking; and
- [0032]** Fig. 12 illustrates an exemplary LED package with molten metal in a heat sink relief.

### **Detailed Description**

**[0033]** As mentioned above, the present invention relates to new and improved methods and apparatus for LED packaging to efficiently remove excess heat during active operation. In particular, the present invention discloses LED packaging with enhanced heat conduction using augmented thermal capacity materials and novel methods for processing thereof. Specifically, the present invention either redirects heat away from or bypasses through a silicon substrate in the context of a horizontal LED assembly.

**[0034]** In some embodiments, the present apparatus provides a LED package which conducts heats away from the LED die and reflects light energy away from the wafer. The present invention comprises optically reflective pads with enhanced conduction properties relative to alternate materials which are used currently in the art. In one embodiment, reflecting pads are disposed adjacent to

wafer spacers and proximal the LED die. In another embodiment, the reflecting pads are used in concert with an additional reflecting pad disposed directly adjacent to the doped LED surface.

**[0035]** In one or more embodiments, the present invention provides a LED package which conducts excess thermal heat away from the LED device via a novel heat sink apparatus. Its methodology includes creating a void in the wafer beneath the mounted LED die and disposing metal proximate to the doped LED face. This allows for thermal conduction to pass from LED device to the distal face of the silicon wafer.

**[0036]** Modern LED devices are based on semiconducting materials and their properties. For example, some LEDs are made using Gallium Nitride (GaN) which is a type of bandgap semiconductor suited for use in high power LEDs. Ga LEDs are typically epitaxially grown on a sapphire substrate. These LEDs comprise a P-I-N junction device having an intrinsic (I) layer disposed between a N-type doped layer and a P-type doped layer. The device is driven using suitable electrical driving signals by way of electrodes or contacts coupled to the N and the P type portions of the LED. Electronic activity causes the emission of visible electromagnetic radiation (light) from the intrinsic portion of the device according to the electromotive force applied thereto and configuration of the device.

**[0037]** The embodiments described and illustrated herein are not meant by way of limitation, and are rather exemplary of the kinds of features and techniques that those skilled in the art might benefit from in implementing a wide variety of useful products and processes. For example, in addition to the applications described in the embodiments below, those skilled in the art would appreciate that the present disclosure can be applied to making and packaging power integrated circuit (IC) components, radio frequency (RF) components, micro electro-mechanical systems (MEMS), or other discrete components.

**[0038]** Gallium Nitride LEDs can be epitaxially grown on Silicon, GaN, SiC or Sapphire substrates. Fig. 1 represents a characteristic horizontal-type Ga LED chip 10. As described, GaN layers 11 are grown upon a substrate 12. GaN is chosen for its wide band-gap and high brightness properties. At minimum, GaN layers 11 comprise a n-type doped region disposed directly adjacent to substrate 12 and electrically connected to pad 14 and p-type doped region electrically connected to pad 13.

**[0039]** An active region makes up the interface of the GaN layers between the p-type and n-type regions. The active region is between 10 to 20 microns thick and the source of photon emission where electron/hole recombination occurs. LEDs can be of two main types: horizontal and vertical. In a horizontal LED, the substrate is electrically isolating such as sapphire, whereas the substrate in vertical LED is a conducting material such as SiC or GaN.

**[0040]** Fig. 2 depicts an exemplary LED die 20 with a reflective layer 26 in a horizontal construction. In one embodiment, the reflective layer 26 comprises a silver (Ag) or aluminum (Al) conductive metal pad which is deposited and patterned on the top of the wafer. In the present embodiment, the reflective layer is electrically isolated. In that, the conductive metal pad passes no current. Alternatively, the reflective layer 26 can connect to electrical conductive fingers which provide efficient current distribution to the surface of the LED. In this configuration, reflective layer 26 can be in electrical communication with p-type pad 23 or replace it entirely.

**[0041]** In another embodiment, two media (25, 26) of increasing indices of refraction are used as to reflect light back through GaN layers 21 and sapphire substrate 22. Transparent electrode 25 is fabricated from a transparent electrode material, such as, indium tin oxide (ITO) or zinc oxide (ZnO). In some embodiments, transparent electrode 25 conveys electric power to GaN layers 21 and covers the whole LED area. Reflective surface 26 and transparent electrode material 25 have thicknesses of 0.5 – 5 microns. N-type pad 24 and p-type pad

23 is also fabricated to provide optical reflections as well as electrical contacts comprising Al or Ag to optimize shorter wavelengths below 500nm which GaN produces.

**[0042]** In other embodiment the pads 23, 24, and reflective surface 26 can be fabricated with Gold Tin (Ag Sn) layers to enable eutectic bonding of the LED to LED carrier. As is known in the art, a eutectic system is a mixture of chemical compounds or elements that have a single chemical composition that solidifies at a lower temperature than any other composition made up of the same ingredients.

**[0043]** In those embodiments using conductive pads or layers, electrical isolation must be provided from the GaN layers. This can be achieved with a silicon oxide (SiO) layer deposited using plasma enhanced chemical vapor deposition (PECVD). Since current manufacturing processes include SiO passivation, a layer is all that is required is to pattern the electrical pads and then deposit a second metal later for the reflective pad. The reflective layer(s) will also be used as a pad contact for heat dissipation. More information is disclosed in the related application U.S. Patent App. No. 13/424,875 entitled, "Wafer Level Packaging of Electronic Devices" which is hereby incorporated by reference in its entirety.

**[0044]** The LED can be a vertical type LED or horizontal type LED where the pads are designed to be at the same height. GaN layers may be grown on one substrate and transferred to another substrate in a laser lift off technique. Other laser techniques known in the art are also not beyond the scope of the present invention. It should be appreciated that GaN type LEDs are not the only kind of LED materials that can be employed in the present discussion, but that the present description is merely illustrative so that those skilled in the art can appreciate some preferred embodiments and methods for making and designing the present LEDs.

**[0045]** Similarly, in the following preferred and exemplary illustrations, it is to be understood that many other similar and equivalent embodiments will be apparent

to those skilled in the art and which accomplish substantially the same result. This is true as to variations in the geometry, layout, configurations, dimensions, and choice of materials and other aspects described in the present examples.

Specifically, certain described elements and steps can be omitted, or others can be substituted or added to that which is described herein for the sake of illustration without materially affecting the scope of the present disclosure and inventions.

**[0046]** Fig. 3 illustrates an exemplary flip-chip method of LED manufacturing in preparation of wafer level processing prior to LED die 10 adhesion to silicon wafer 31. In one embodiment, silicon wafer 31 is coated with a reflective material, such as, gold (Au), aluminum (Al), silver (Ag), or a dielectric stack. The coating serves two purposes. It reflects light energy in the generally orthogonal direction away from the silicon wafer 31. And, it also acts as an efficient thermal coupling by conducting heat away from the LED die 10. In one embodiment, the coating can cover the entire wafer with holes for the electrical pads.

**[0047]** In a preferred embodiment of the present invention, the coating is designed to cover the LED undersurface except for areas of electrical pads nor the area designed to be the thermally conducting connection, which will be discussed in greater detail later. Referring to Fig. 3, the coating is patterned and deposited on the silicon wafer 31 engendering peripheral reflectors 34, 35 disposed proximately to spacers 32, 33, respectively. The coating and/or peripheral reflectors 34, 35 can be patterned to provide die attach marks.

**[0048]** The coating is preferably made of metal, such as, Al, Au, Ag, Cu or other conducting material. It should be noted that state of art method of electrode formation includes depositing a SiO<sub>2</sub> or other electrically insulating and optically transparent layer on top of the P and exposed N layers. This layer is then exposed using photolithography and chemical etching to reveal the layers in specific locations which become the electrical and thermal contact pads. The metal is then deposited on top the insulating layer and electrical contact is

facilitated in the exposed portions. Other state of art techniques include selective doping of contact areas to reduce electrical resistivity.

**[0049]** The metal contact can have a plurality of metal constituents each with a specific purpose, e.g. light reflection, heat conduction, adhesion to the GaN layers or matching the work function of the GaN layers. In another embodiment, the metal cover can be composed of two or more, electrically isolated parts. One part(s) is electrically connected to the p-layer and provides electrical contact as well as thermal contact, and the other part(s) provide optical reflection and thermal connection.

**[0050]** The LED can also be without a reflector layer, and can be of different types such as a vertical LED, or a die attach LED in which both contacts are at the bottom side of the LED.

**[0051]** Fig. 4 portrays an exemplary LED package 40 with silicone encapsulated peripheral reflectors. LED die 10 is affixed to the silicon wafer 31 using a nonconductive epoxy, or silicone adhesive. An example of such a material is Shin Etsu KER-3100-M2 or Epotek ND353. In one embodiment, the adhesive layer 41 comprises, at least in part, material optimized to provide both heat conduction as well as light reflection, diffusion or transparency.

**[0052]** For example, a zinc oxide (ZnO) or boron nitride (BN) filler can be applied to the adhesive layer 41. LED light is reflected at the interface between LED and adhesive layer 41 when reflective material is chosen. Transparent or diffusive adhesive layer(s) 41 pass light from the diode which gets reflected back towards the silicone encapsulation 42 of the peripheral reflectors. The present embodiment can also be used in conjunction with a LED reflector chip 20 in accordance with the detailed description of Fig. 2. As a metric for suitable performance, heat conduction of 3 W/mK or more is sufficient. Adhesive layer 41 can also be designed to be easily removed in an etching or ashing process.

**[0053]** In other embodiments, the LED die 10 is attached to metal bumps using eutectic bonding. The metal bumps are laid out and deposited as part of the peripheral reflectors 34, 35 but patterned to create electrically isolated regions. As described, the metal is deposited on a dielectric layer which provides electrical isolation from the electrical pads to the silicon carrier 30. The dielectric can be silicon oxide (SiO), silicon nitride (SiN), or other inorganic thin films. The layer can also be a thin film of organic material, such as, polyimide or solder mask. The resultant structure in the present embodiment comprises juxtaposed strata of silicon carrier, dielectric, and metal layers.

**[0054]** LED package 40 further comprises silicone encapsulation 42 and photoluminescent layer 43. Silicone encapsulation 42 is an optically transmissive layer filling all voids on the carrier wafer by creating a surface coplanar to the silicon substrate. Photoluminescent layer 43 is comprised of phosphor or quantum dot material enable the conversion of the light generated by the LED to other colors. The most common is the use of phosphor to enable White light from a blue LED. The Silicone encapsulation can be applied using screen printing, spin coating, spray coating, injection molding or other similar process. In an additional embodiment, the encapsulation can be composed of one or more layers, with different refractive indexes or other optical, mechanical or thermal properties in order to reduce reflectance loss of the light, or enhance the mechanical dexterity of the process. In an additional embodiment, the package can be finalized without a cover layer. In this embodiment, the Silicone can also include optical elements such as lenses, diffractive optical patterns, or gratings. These structures will provide optical functions such as focusing, specific light distribution, anti reflective properties, light collection or polarization filtering or reflection. If injection molding is used to create the encapsulated Silicone, the optical patterns can be part of the mold. In another embodiment, the carrier wafer has no side reflectors, 32 in figure. 3, and the encapsulation provides a continuous layer of material on the carrier wafer.

**[0055]** The LEDs are individually assembled on a carrier wafer, with the sapphire layer facing the carrier wafer layer. An optically transparent cover made of glass, polymer or other materials is then attached to the wafer top. The carrier wafer layer of optically transparent can include other optical components such as lenses or light diffusing structures or light guiding structures. In one embodiment the lens shape is created by the surface tension of a drop of polymer or silicone material. In another embodiment the lens is created by hot embossing of a polymer which is applied to one side of the carrier wafer. The carrier wafer may be further patterned to create specific drop shapes, sizes and desired surface qualities.

**[0056]** The system may be coupled to other optical elements as would be appreciated by those skilled in the art. One or more optical lens or assembly of optical lenses, Fresnel layers, filters, polarizing elements, or other members can be used to further affect the quality of the light provided by the LED device.

**[0057]** In another embodiment, there is an air cavity between the cover and the LED active layer. The air cavity provides a high thermal resistance and reduces the temperature in the cover. The reduced temperature increases the lifetime of phosphor or quantum dot material. To create the air cavity, a photo definable material is deposited on the cover substrate.

**[0058]** The photo definable material can be solder mask material or photoresist, such as, BCB, SU8, or other suitable polymer materials known in the art. After deposition, the cavity is defined and imaged leaving material at the cavity boundaries to support the contact to the LED active surface. Additional such cavities can be defined and multiple cover substrates can be used to define cavities for the phosphor material as well as for optical elements such as lenses or diffusers. In one embodiment the lens shape is created by the surface tension of a drop of polymer or silicone material. The cover substrate may be patterned to create specific drop shapes, sizes and surface qualities. The glass can be loaded with phosphor material during production. The glass may also include particles to induce light diffusion.



**[0059]** The cover substrate is bonded to the LED active layer using epoxy, silicone or BCB or other suitable material. In additional embodiments, the package can be done without a cover substrate. In this case the top most layer would be the encapsulant Silicone layer or the encapsulant and Phosphor filler layer. As described above, the encapsulant layer can also include optical elements such as lenses.

**[0060]** Fig. 5 illustrates an exemplary etching view during wafer processing. After attaching the cover substrate 54 to the LED package 50, the distal side silicon wafer 31 is ground to a thickness of less than 100 microns. Reducing the thickness of the silicon enhances the thermal conductance of the LED package 50 and reduces the temperature of the LED during operation. The process of back grinding induces wafer stress that can propagate into the bulk of the wafer causing it weaken. After grinding, a stress relief is etched in plasma and vias (holes) 51, 52 are etched in the distal side of the silicon wafer 31.

**[0061]** There are two types of geometrical reliefs which are evident in the Fig. 5 profile of the LED package 50, which is provided by way of illustration. Those skilled in the art will appreciate that the present examples can be generalized and applied to other specific designs and uses. The first type is a via (hole). A via is an electrical connection between layers in a physical electronic circuit that goes through the plane of one or more adjacent layers. Electrical connection vias 51,52 are etched through the remainder of the silicon wafer 31 and adhesion layer 41 to provide pathways to the electrical pads 55, 56 in the LED package 50. Via diameters are in between 10 to 150 microns and preferably greater than 60 microns. Via angles range from 45 to 90 degrees and preferably between 60 and 70 degrees.

**[0062]** A second type of geometrical relief is a thermally conducting hole 53 pursuant to the present invention. Thermally conducting hole 53 is etched through the remainder of the silicon wafer 31 and at least part of adhesion layer 41 in a location proximate to the GaN layers of the LED package 50. It preferably

displaces much of the silicon and adhesive volume proximate the LED die. In one embodiment, the surface area displacement of thermally conducting hole 53 is 250000 microns<sup>2</sup>. In others, the area can be greater than 700 microns by 700 microns. As indicated, the etching is performed until reaching the adhesive layer 41.

**[0063]** In an embodiment, all of exposed adhesive layer 41 is removed. This can be accomplished using the silicon reactive ion etch used with silicon wafer 31 or by changing the chemistry to an oxygen rich etch (ashing). More specifically, since the adhesive layer is either an epoxy based or Silicone based layer, it is expected that that chemistry used for via etching, namely SF<sub>4</sub> or SF<sub>6</sub>, will not be effective in etching the adhesive layer. In case the adhesive layer is composed of Silicone, then adding O<sub>2</sub> to the SF<sub>4</sub> or SF<sub>6</sub> process can result in an anisotropic etch of the adhesive layer. Alternatively, the adhesive layer is removed in a second process of only O<sub>2</sub> plasma. Alternatively, the removal of the adhesion layer 41 can also be executed using a wet chemical etch or other suitable means which is known in the art. In the embodiment where the LED die has a reflective layer 26, the metal layer can act as etch stop layer, in another embodiment the LED passivation layer such as SiO<sub>2</sub>, will act as the etch stop layer. In the context of the embodiment where thermal conductance of the adhesion layer 41 is above 1W/mK, some of the adhesion layer 41 can remain in the thermally conducting hole 53. Also if the adhesive is designed to be highly reflective such as a Silicone with Zinc Nitride particles, and there is no reflector layer on the LED, it may be desired to leave 1-5 microns of the adhesive

**[0064]** Fig. 6 depicts an exemplary orthogonal view of the LED package 60 as seen from the side of the silicon wafer 31 after etching vias 51, 52 and thermal conduction hole 53. As is common in LED packaging, LED die 10 comprises two n-type electrical pads 61 and on p-type electrical pad. As previously enumerated, any of the shown elements can have some type of reflective composition in addition to the property of high thermal conductivity.

**[0065]** Fig. 7 illustrates an exemplary profile view of the LED package 70 during wafer processing showing masking placements. After etching, a passivation layer will be applied to the distal side of the silicon wafer 31. The passivation layer is typically an organic material and hence not a good heat conductor. It would be desired to remove the passivation layer from the thermal via. In one embodiment, we use a shadow mask to prevent formation of the passivation in the thermal hole. In this case, prior to passivation, the area designated as the thermally conductive hole 53 is covered using a shadow mask 71. Shadow mask 71 comprises any suitable material which can be patterned with the substantially same dimensions and location as the thermally conductive hole 53. Exposed vias 51, 52 are areas to be passivated. Where there are area not to designated for passivation, blocking material 72 is patterned and deposited, or vice-versa..

**[0066]** Fig. 8 illustrates an exemplary method of passivating the carrier side of a LED package 80 according to one embodiment of the present invention. Passivation layer 81 applied to the distal side of the silicon wafer 31. The shadow mask 71 and blocking material 72 is then selectively removed, as is known in the art. In another embodiment, the shadow mask 71 is foregone and the passivation layer can be selectively patterned after deposition.

**[0067]** In one embodiment, the passivation layer is a photo imageable material such as WLP 32, or other solder mask like material. In this case, the use of standard photo lithography masks, imaging system, and developing process will result in holes both for the thermal via as well as electrical vias.

**[0068]** In another embodiment, a hard mask layer is deposited on the passivation material. The hard mask can be a metal such as Al, or isolating material such as SiN or SiO<sub>2</sub>. The mask layer may be applied at a low temperature process which will not damage the polymer Passivation layer. The mask layer can be thick enough so that the passivation layer can be etched without dimension changes in the mask layer. In most cases 1-5 micron should suffice. A photo resist is deposited on the mask layer and patterned. The mask layer is then patterned

using a selective wet etch so that only the mask material is removed. Then the underlying passivation layer and potentially die attach adhesive layer is etched. In most cases the etching would be done in O<sub>2</sub> plasma.

**[0069]** The passivation layer 81 is a nonconductive layer comprising SiO<sub>2</sub>, SiN, AlN, Al<sub>2</sub>O<sub>3</sub> or organic material, such as, epoxy, or electrophoretic deposited paint as used in the car industry or spray coating. Passivation layer 81 thickness ranges from 1 to 40 microns, depending on the material and required electrical passivity. Alternatively the passivation layer is a thermally conductive layer such as SiN or AlN which is used to minimize the thermal conductance of the package.

**[0070]** The passivation layer is also removed to enhance the heat conduction of the LED. Hence to optimize the heat conductance, a maximal contact should be made between the metal and metal pads on the LED and the metal layer. This is done by opening the largest possible area on the passivation layer and preferably greater than 80%. If the LED is designed with a thermal pad structure then the P connection can be connected to thermal and P pad or alternatively three metal connections are facilitated, N, P and thermal.

**[0071]** In another embodiment, the passivation is also removed in areas where there is no metal layer, only the electrically insulating layer. This can occur, if instead of the LED described previously, a standard LED is used in which the metal covers only a small portion of the top of the LED. In this case the metal layer deposited in this stage will provide the heat removal and light reflection. In this manner, the exposed portions of the LED will extend beyond the metal areas. The newly deposited metal will again cover substantially all of the LED structure.

**[0072]** In another embodiment, if the electrical passivation layer is optically reflecting and heat conducting the layer may be maintained and the metal passivation will cover substantially all the LED area but will make a direct connection to the LED metal pads, and in other areas the connection layers would be through the passivation layer, i.e. the layer stack would be, LED, LED

passivation layer, packaging passivation layer which provides low thermal resistance and light reflection, packaging metal for heat conduction.

**[0073]** Fig. 9 illustrates an exemplary wafer 90 with metal seed layer 91 patterned thereto. In preparation for the metal deposition, some of the passivation layer 81 must be removed so that electrical and thermal contact can be made with the pads. Electrical and thermal contact holes are drilled through the passivation layer until reaching the metal pad. If a laser is used, the laser can either stop at the metal pad (blind via) or cut through the pad and the electrical connection would then be done using the pad side wall thickness. A plasma etch can also be used to create the contact holes in the same processing step as the etch for the thermal connection, If SiN or SiO<sub>2</sub> are in passivation.

**[0074]** The metal seed layer 91 comprises aluminum, titanium, chrome, nickel, palladium, platinum, copper or combinations thereof. Metal seed layer 91 is deposited using sputtering or other suitable means. In one embodiment, aluminum is initially deposited as the metal seed layer 91 to provide good reflectivity from the LED surface towards the LED backside and output from the LED package 90.

**[0075]** Fig. 10 demonstrates an exemplary orthogonal view of the wafer 100 with metal patterned thereto. Metal seed layer can be patterned using electrophoretic deposited photo resist, spray coating resist, or thick resist. The resist is patterned to create the electrical routing connections and under bump metallization, as well as the metallization for the heat conducting element. After patterning the resist, a thick metal layer (between 10 and 40 microns) is plated in the predetermined pattern, such as, metal strips 101, 102, 103. The resist is removed, and the bare seed layer is etched by using a wet metal etch.

**[0076]** Fig. 11 demonstrates an exemplary orthogonal view of the wafer 110 showing solder masking 111. The heat conduction element is a direct metal

connection from a significant portion of the area of the LED to the printed circuit board to which the LED is attached.

**[0077]** Fig. 12 illustrates an exemplary LED package 120, where the recess of the thermal connection is filled with metal. One embodiment of filling metal or metal laden polymer can be done using a screen printing process akin to the process where solder bumps are made in standard BGA packages. In this technology, solder paste, which is a polymer laden with Tin is applied in a screen printing machine. The print is applied to selected areas, in this case the thermal holes. A further reflow process may be done, in which the polymer material is evaporated and the shape of the Tin (Sn) or other metal may be changed by melting it into the desired thermal via recess. In this case the thermal via recess will be filled with metal. In another embodiment, the metal may be applied in the manner of a Solder ball which is dropped in place from suitable machines. Such machines are known in the art and used in Ball Grid Area (BGA) electronic packages. After dropping the ball in place, the material can again be reflowed, to occupy the thermal recess. Alternatively, the structure can be reflowed as part of the SMT assembly process. The metal filler 121, is shown in figure 12. The metal can be any of state of art BGA balls such as Sn96.5 Ag3.0 Cu0.5, or other compositions of Sn, Ag, Cu, or Sn Pb Ag compositions. The filler can also be other heat conducting materials including polymers with heat conducting fillers such as Ag, BN, SiN, AlN, and others.

**[0078]** The present invention should not be considered limited to the particular embodiments described above, but rather should be understood to cover all aspects of the invention as fairly set out in the attached claims. Various modifications, equivalent processes, as well as numerous structures to which the present invention may be applicable, will be readily apparent to those skilled in the art to which the present invention is directed upon review of the present disclosure. The claims are intended to cover such modifications and equivalents.

**[0079]** What is claimed is:

### Claims

1. A light emitting device, comprising:
  - a carrier wafer, wherein a substantial amount of carrier wafer is removed to create a relief;
  - a semiconductor LED including doped and intrinsic regions thereof, said semiconductor LED is affixed to said carrier wafer proximate to said relief;
  - a thermally conductive layer disposed adjacent to said semiconductor LED in said relief;
  - at least one optically reflective surface disposed between said carrier wafer and said semiconductor LED proximate to said carrier wafer; and
  - a substantially optically transmissive layer proximal to said semiconductor LED covering at least a portion of the above components.
2. The light emitting device of claim 1, said at least one optically reflective surface comprising metal.
3. The light emitting device of claim 1, said at least one optically reflective surface comprising a dielectric stack.
4. The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of high thermal conductivity.
5. The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical diffusion.

6. The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical reflection.

7. The light emitting device of claim 1, wherein said semiconductor LED is affixed to said carrier wafer with an adhesive material which has the property of optical transmissivity.

8. The light emitting device of claim 1, further comprising at least one spacer attached to said carrier wafer; whereby, said at least one optically reflective surface is affixed thereto.

9. The light emitting device of claim 1, said thermally conductive layer comprises metal.

10. The light emitting device of claim 1, said thermally conductive layer comprises an organic material with a physical property of high thermal conductivity.

11. A method for making light emitting device comprising the steps of:  
forming a carrier wafer;  
forming a plurality of doped layers in a light emitting device (LED)  
disposed on an optically permissive layer;  
using an optically permissive adhesive to mechanically secure said LED  
onto said carrier wafer;  
forming a recess in said carrier wafer proximate to said LED;  
forming spacers on said carrier wafer proximate to said LED;  
metalizing at least a portion of said spacers; and  
filling said recess with a thermally conductive material.



12. The method for making light emitting device of claim 11, further comprising encapsulating said LED with an optically permissive material and mechanically securing an optically transmissive cover substrate.

13. The method of claim 12, further comprising suspending photoluminescent particles in the optically permissive material.

14. The method of claim 12, further comprising suspending quantum dot particles in the optically permissive material.

15. The method of claim 11, wherein the thermally conductive material comprises metal.

16. The method of claim 11, wherein the thermally conductive material comprises an organic compound with high thermal conductivity.

17. The method of claim 11, wherein the thermally conductive material comprises metal.

18. The method of claim 11, wherein the optically permissive adhesive has the property of high thermal conductivity.

19. The method of claim 11, wherein the optically permissive adhesive has the property of high thermal conductivity.

20. The method of claim 11, wherein the optically permissive adhesive has the property of optical diffusion.

**Abstract**

A light emitting diode (LED) device and packaging with enhance heat conduction. An LED in a wafer level processing (WLP) package is disclosed using vias in the silicon to route the electrical connections to the LED backside and a dedicated hole in the silicon with a direct heat conduction route from the LED to the printed circuit board. Certain layers act to promote mechanical, electrical, thermal, or optical characteristics of the device. The device avoids or ameliorates heat dissipation problems found in conventional LED devices. Some embodiments include a plurality of optically permissive layers, including an optically permissive cover substrate comprising phosphors and/or quantum dots.

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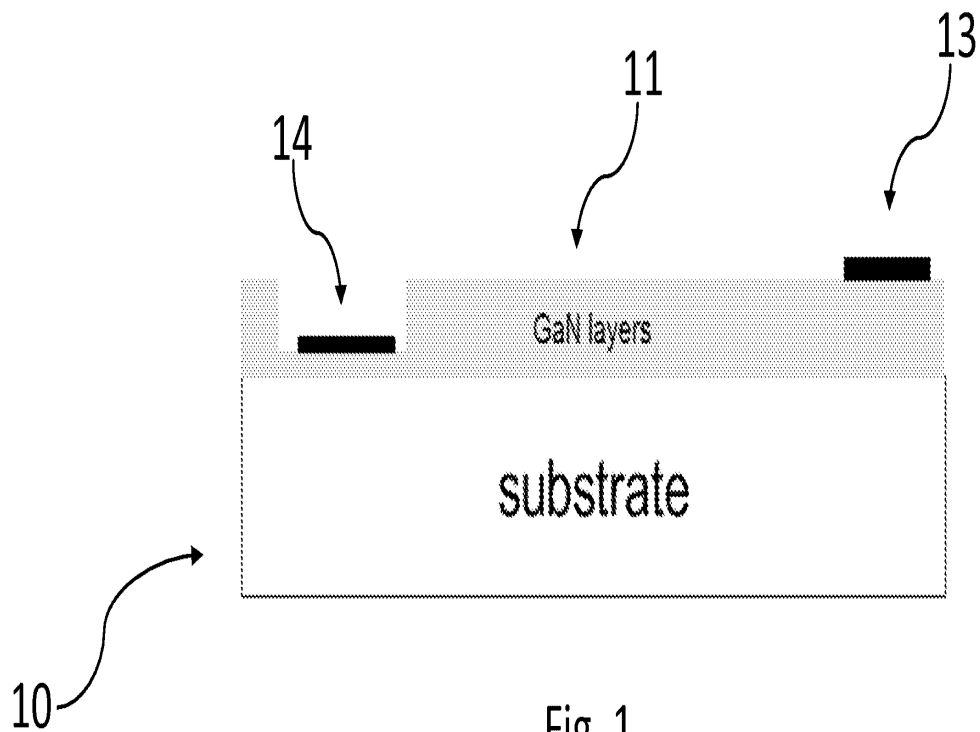


Fig. 1  
(Prior Art)

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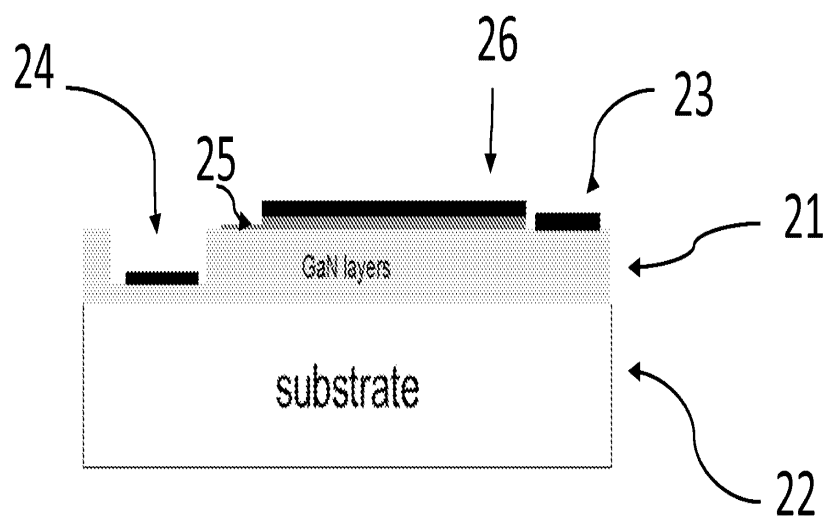
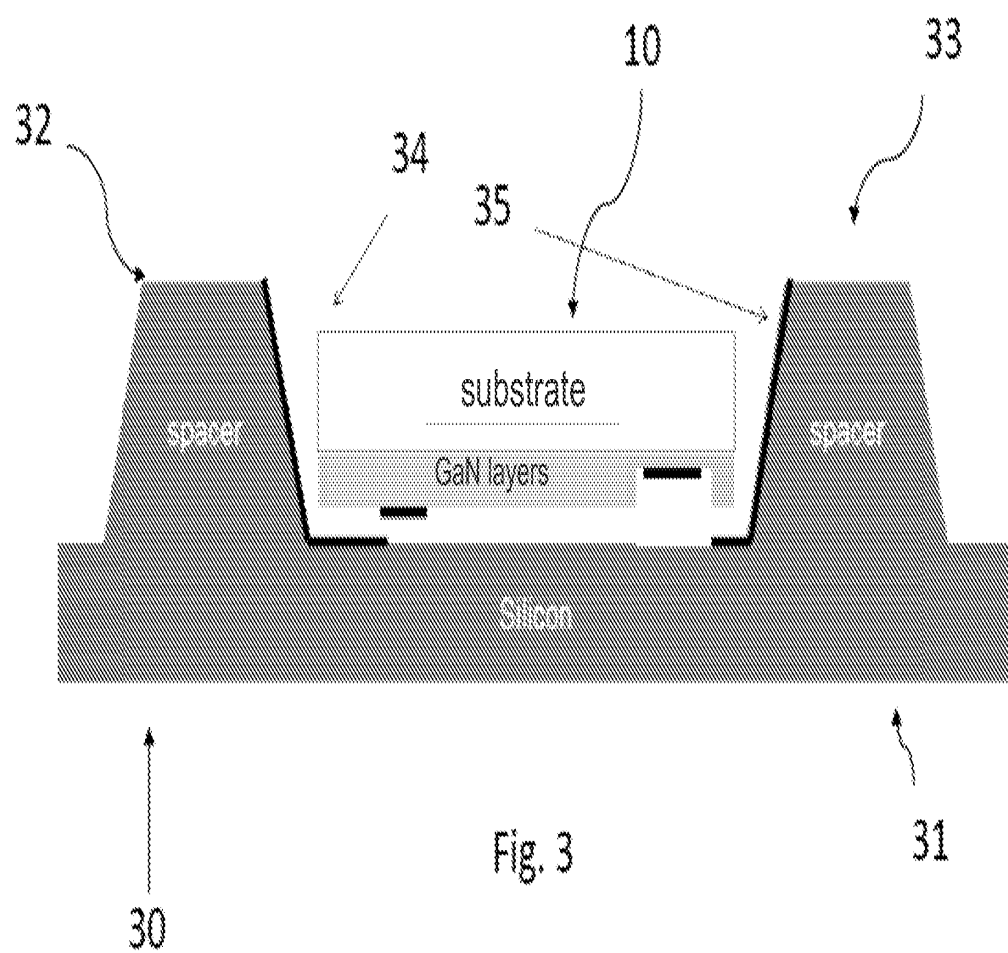
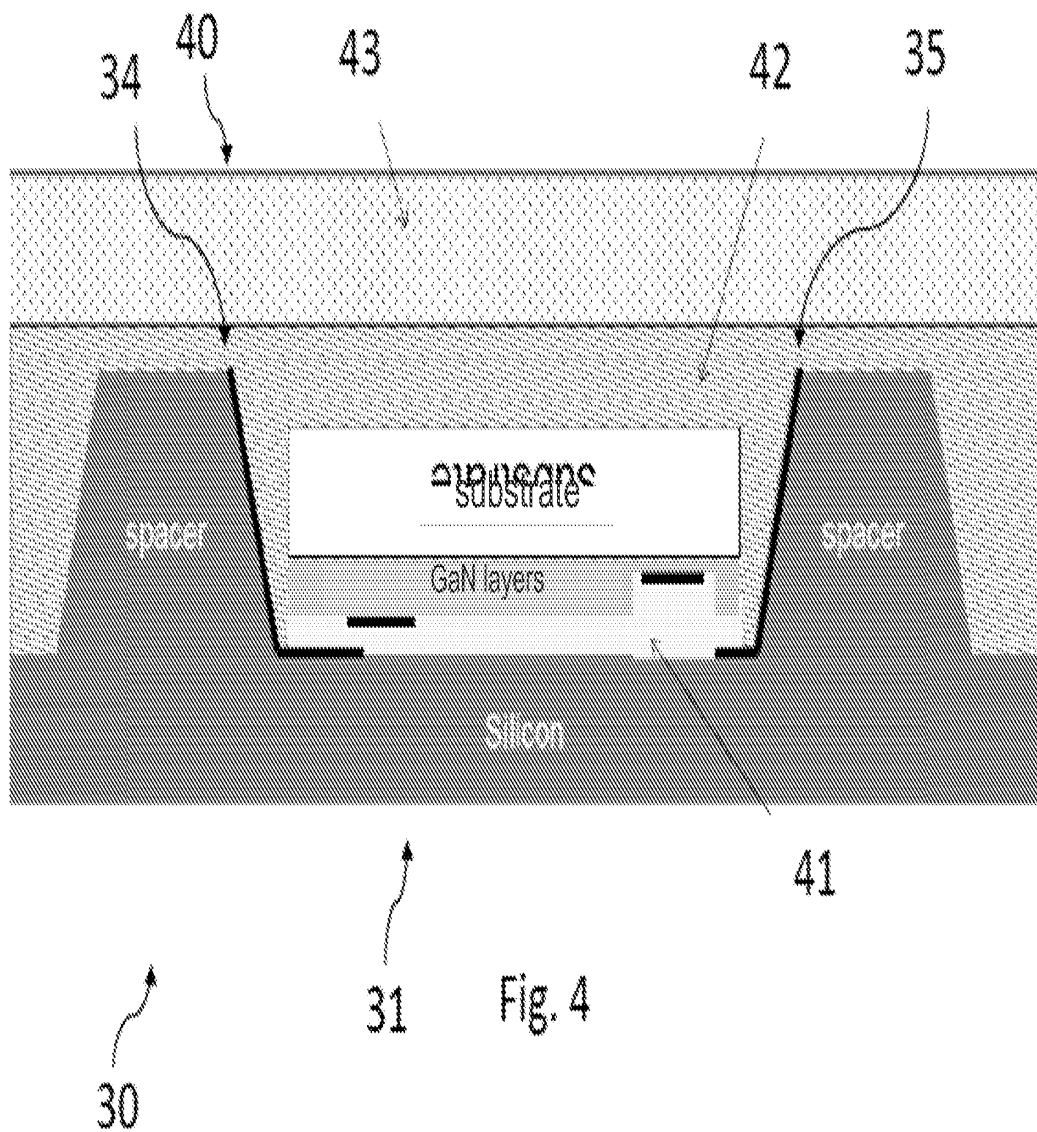


Fig. 2

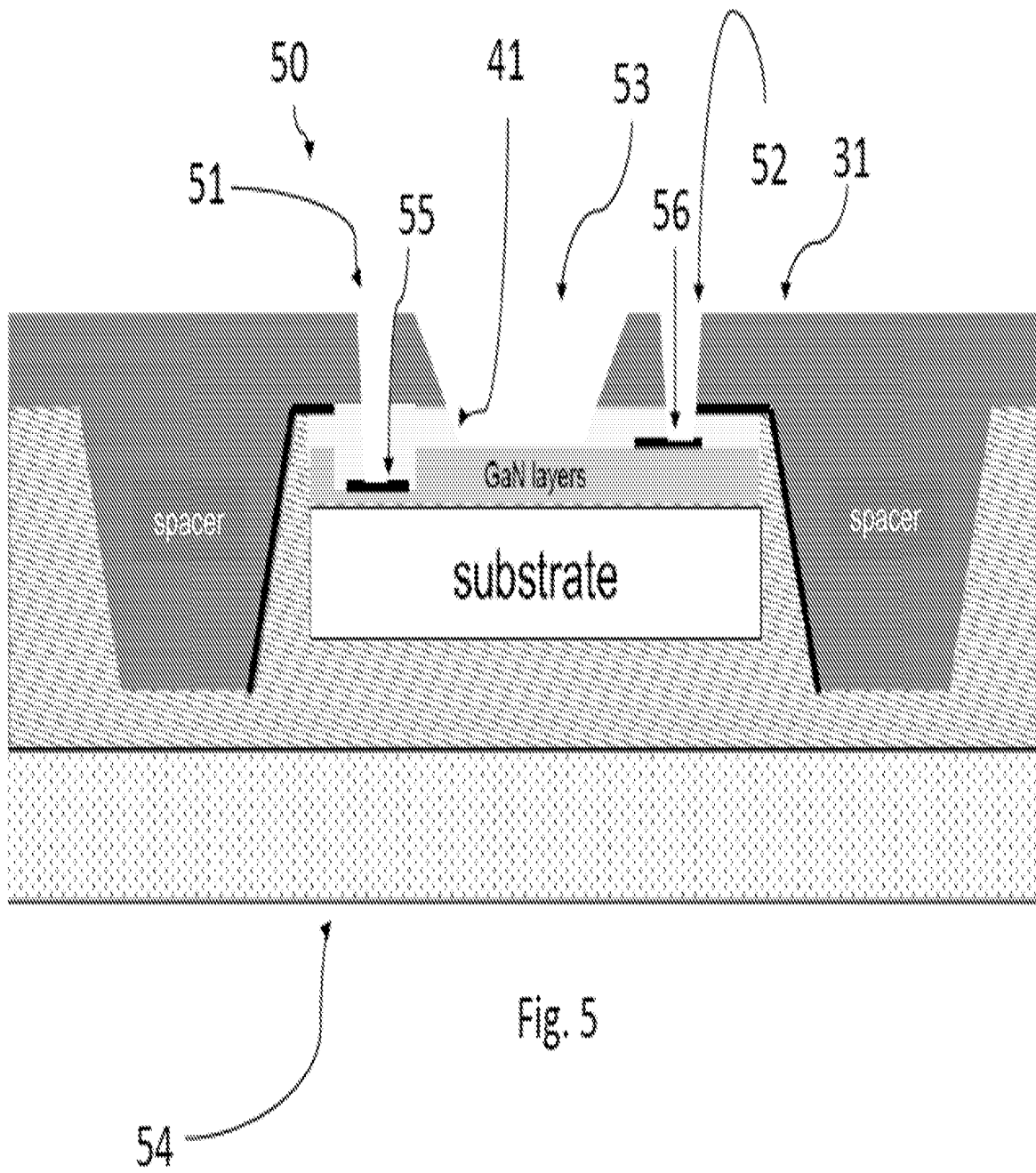
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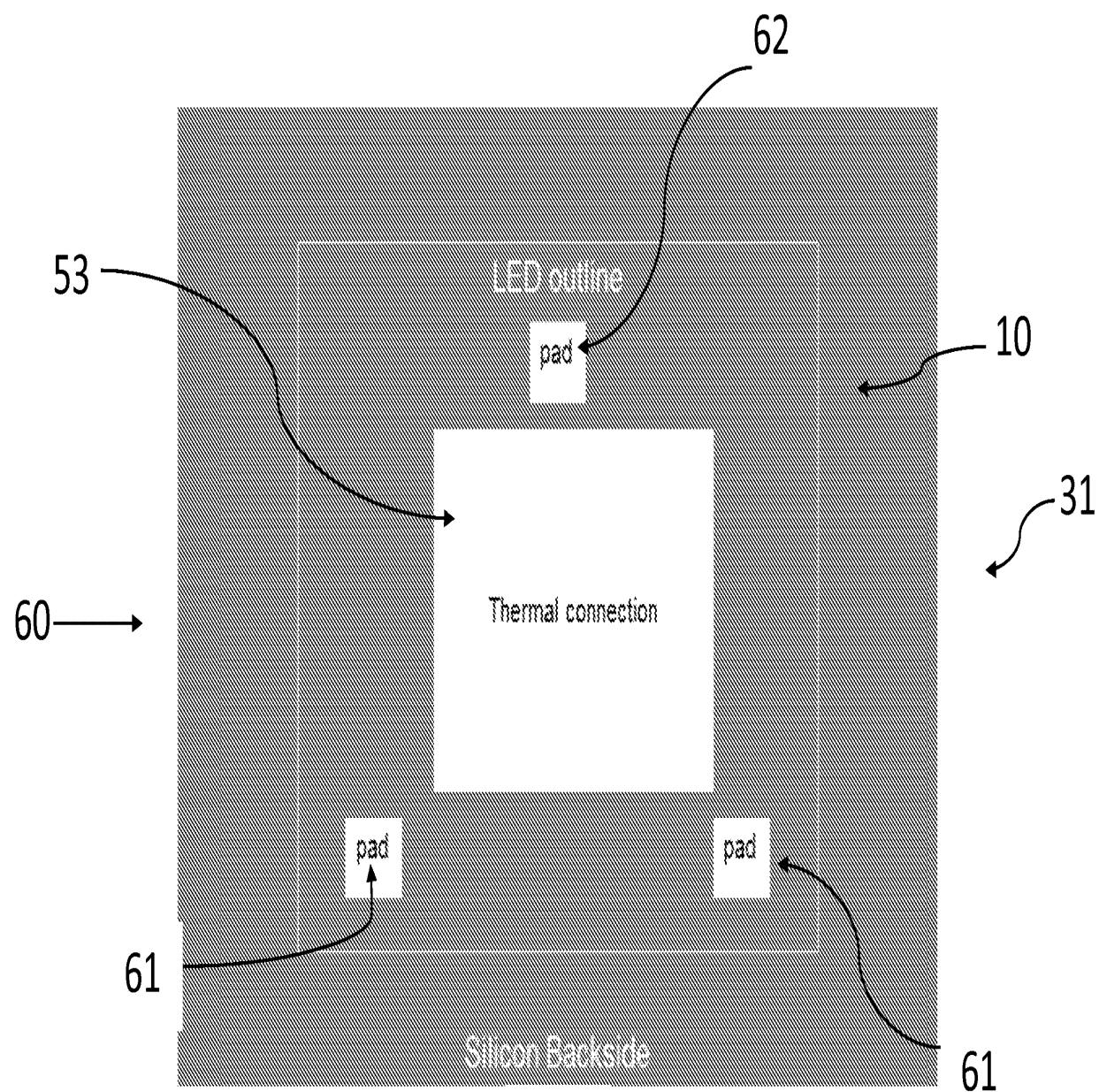


Fig. 6



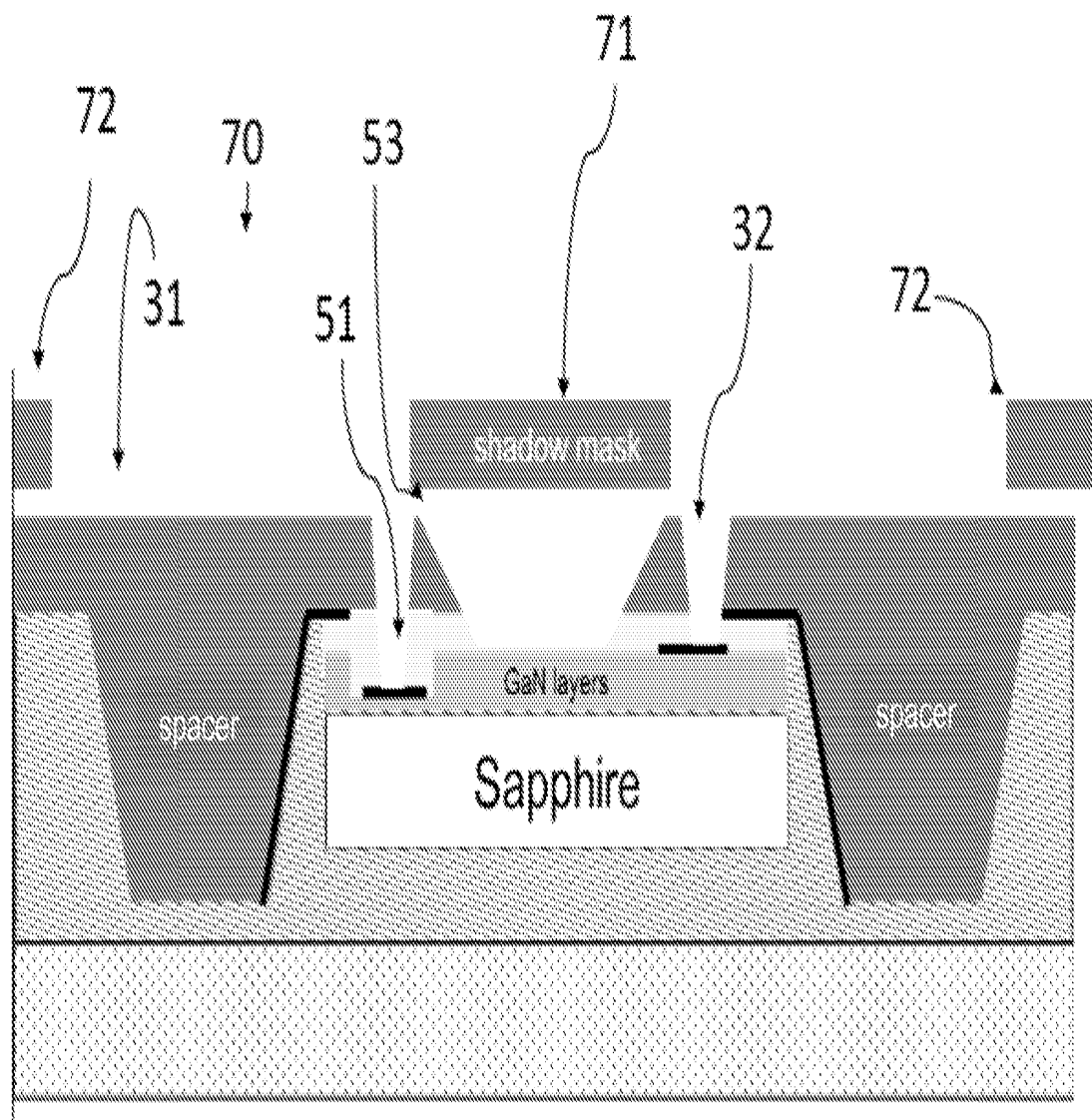


Fig. 7

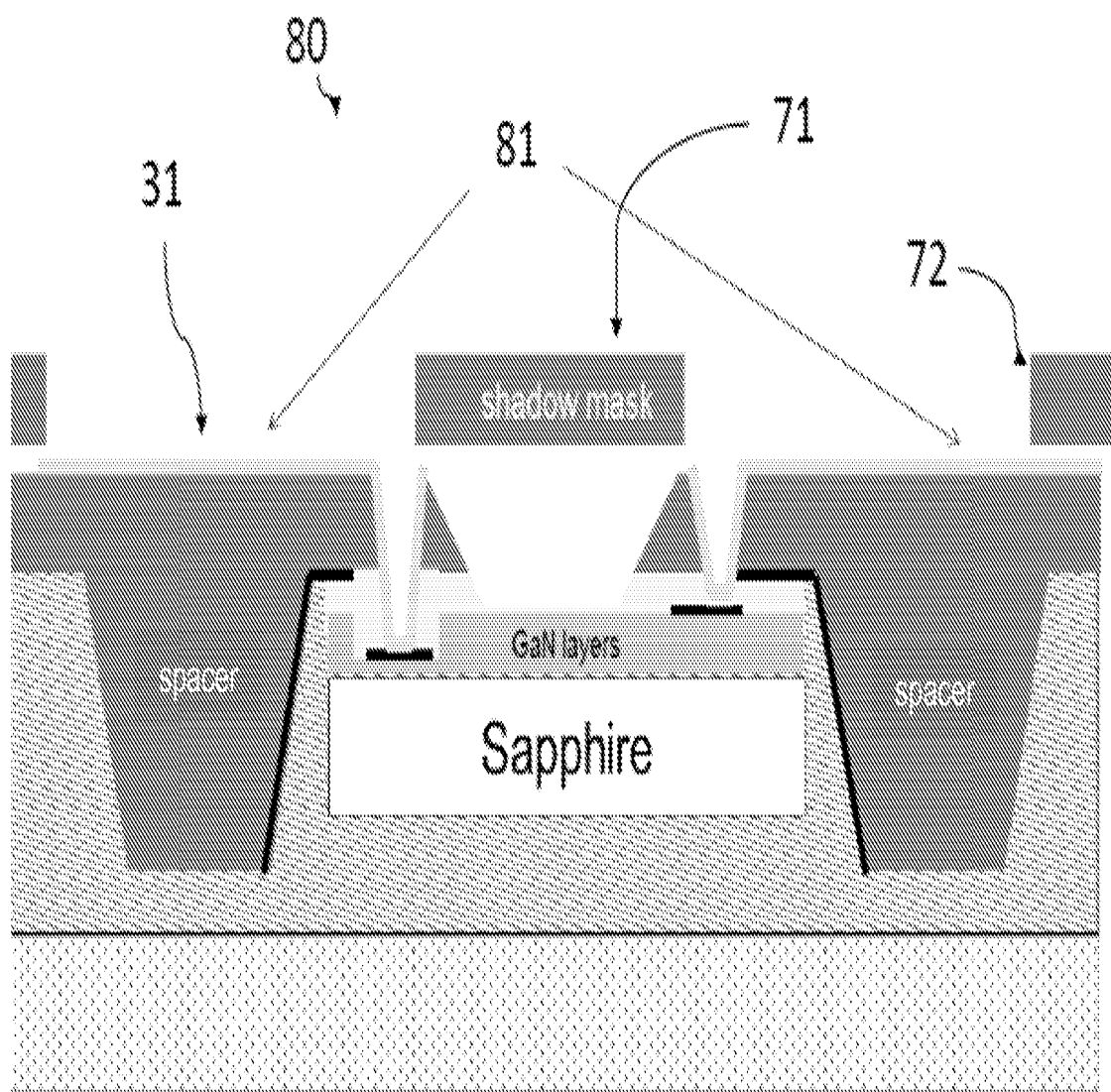


Fig. 8

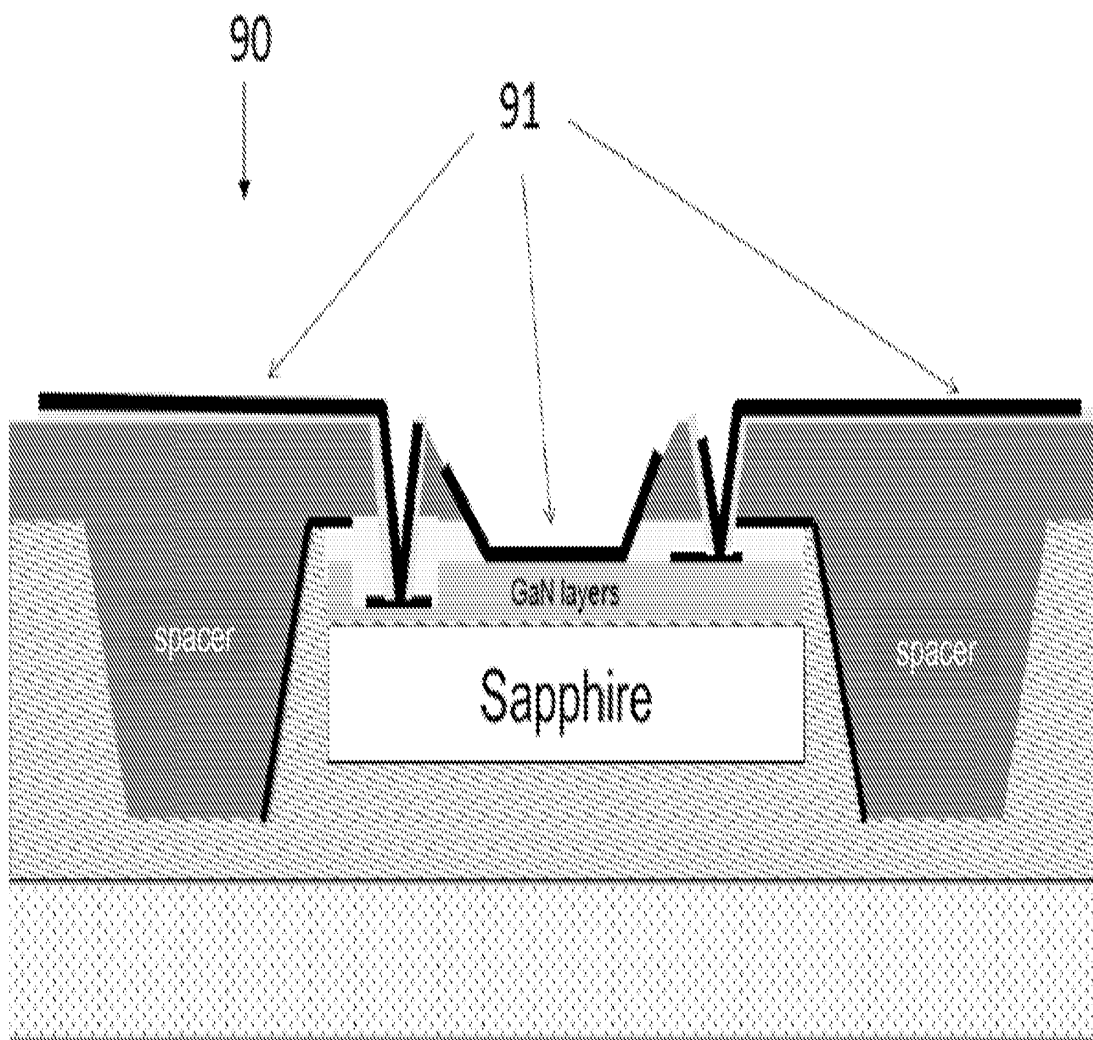


Fig. 9

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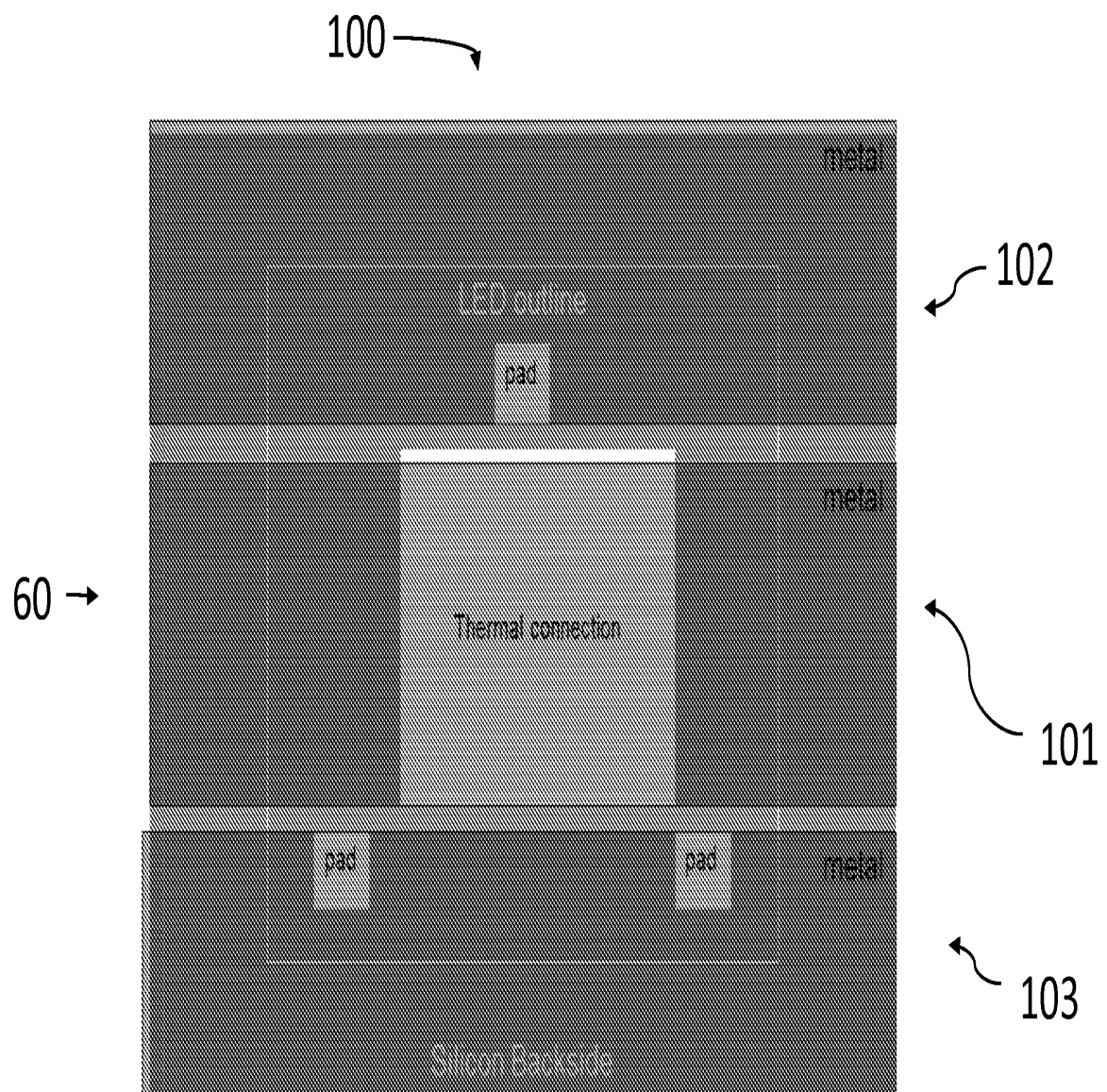


Fig. 10

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110

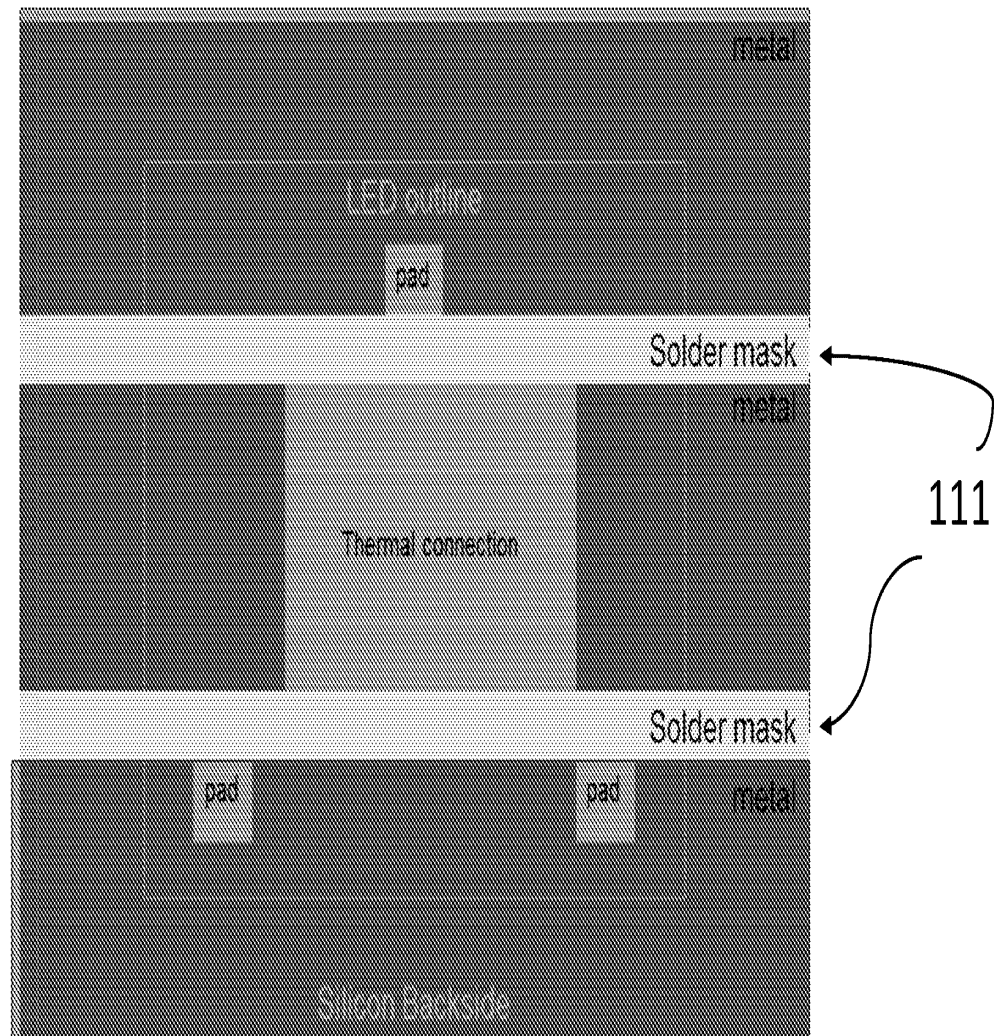


Fig. 11

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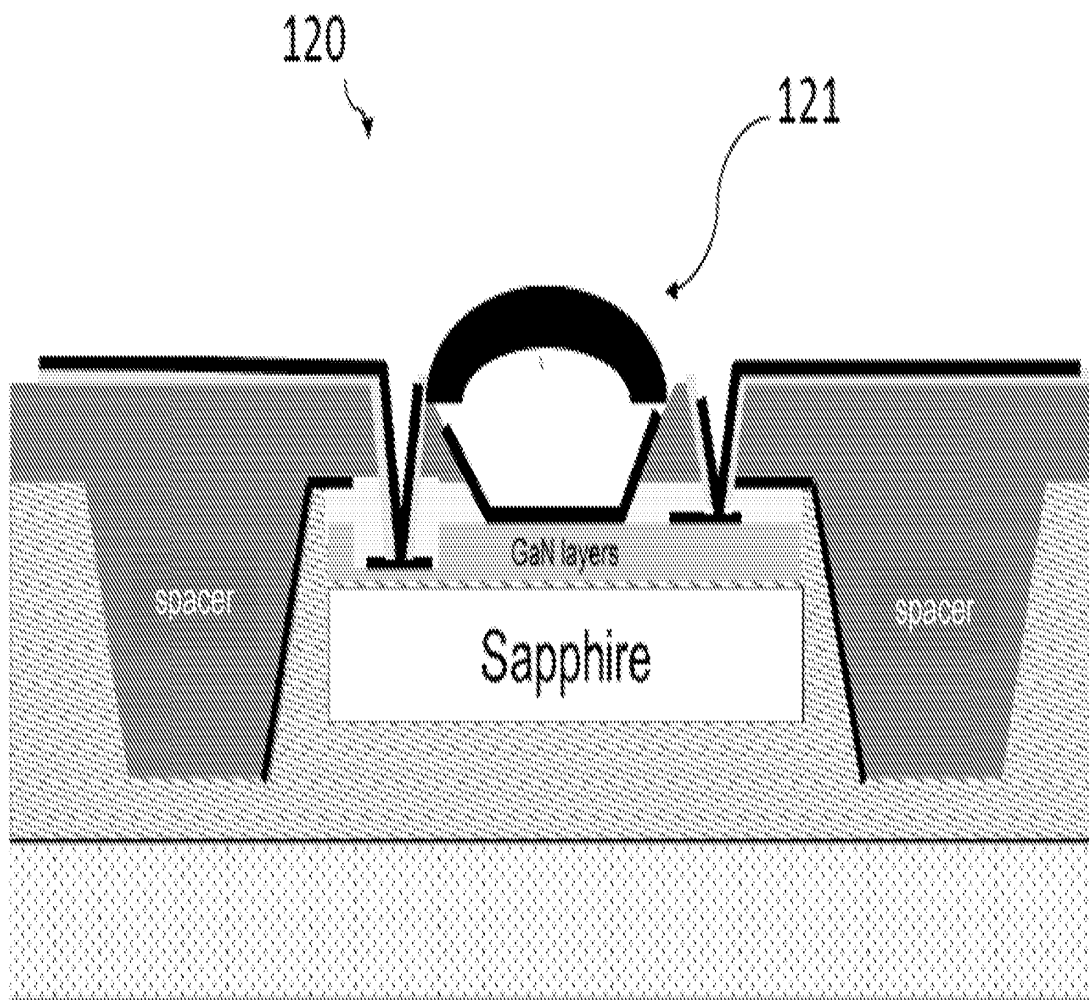


Fig. 12

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Light Emitting Diode Package with Enhanced Heat Conduction		
First Named Inventor/Applicant Name:		Mordehai Margalit		
Filer:		Ibrahim M. Hallaj/Jessica Lecesse		
Attorney Docket Number:		VIA.USCIP.0110		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>730</b>



Electronic Acknowledgement Receipt	
<b>EFS ID:</b>	17060709
<b>Application Number:</b>	14047715
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6858
<b>Title of Invention:</b>	Light Emitting Diode Package with Enhanced Heat Conduction
<b>First Named Inventor/Applicant Name:</b>	Mordehai Margalit
<b>Customer Number:</b>	93255
<b>Filer:</b>	Ibrahim M. Hallaj/Jessica Lecesse
<b>Filer Authorized By:</b>	Ibrahim M. Hallaj
<b>Attorney Docket Number:</b>	VIA.USCIP.0110
<b>Receipt Date:</b>	07-OCT-2013
<b>Filing Date:</b>	
<b>Time Stamp:</b>	17:42:35
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

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Payment was successfully received in RAM	\$730
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Deposit Account	505153
Authorized User	HALLAJ, IBRAHIM M
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<b>File Listing:</b>					
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**New Applications Under 35 U.S.C. 111**

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Electronic Acknowledgement Receipt	
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<b>Application Number:</b>	14047715
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## **SCORE Placeholder Sheet for IFW Content**

Application Number: 14047715

Document Date: 10/07/2013

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