

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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FUJITSU SEMICONDUCTOR LIMITED AND  
FUJITSU SEMICONDUCTOR AMERICA, INC.

Petitioner

v.

ZOND, LLC  
Patent Owner

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Case IPR2014-00866  
Patent 6,853,142

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ZOND LLC'S PATENT OWNER PRELIMINARY RESPONSE  
PURSUANT TO 37 C.F.R. § 42.107(a)

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## I. INTRODUCTION

The Petitioner has represented in a motion for joinder that this petition “is identical to the IPR Intel no. IPR2014-00494 in all substantive respects, includes identical exhibits, and relies upon the same expert declarant.”

Accordingly, based upon that representation, the Patent Owner opposes review on the same basis presented in opposition to Intel’s request no. IPR2014-00494 which is reproduced below:

The Board should deny the present request for *inter partes* review of U.S. Patent No. 6,853,142 (“the ’142 patent”) because there is not a reasonable likelihood that the Petitioner will prevail at trial with respect to at least one claim of the ’142 patent.<sup>1</sup>

Indeed, there are five different and independent groups of reasons why the Petitioner cannot prevail. First, the references that are primarily relied upon by the Petitioner (*i.e.*, Mozgrin and Wang) were already considered by the Examiner and overcome during the prosecution of the application that led to the issuance of the ’142 patent. These references were considered by 6

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<sup>1</sup> 35 U.S.C. § 314(a).

different examiners and overcome during the prosecution of 9 other patents that are related to the '142 patent over nearly a 10 year period.<sup>2</sup>

Second, the Petitioner's obviousness rejections are all predicated on the false assumption that a skilled artisan could have achieved the combination of i) an ionization source generating a weakly-ionized plasma from feed gas, ii) an electrical pulse having a magnitude and a rise-time that is sufficient to increase the density of the weakly-ionized plasma to generate a strongly-ionized plasma, and iii) a gas line supplying feed gas to diffuse the strongly-ionized plasma to thereby allow additional power from the pulsed power supply to be absorbed by the strongly-ionized plasma, as required by independent claim 1 of the '142 patent by combining the teachings of either Mozgrin or Wang and Lantsman.<sup>3</sup> But these three references disclose very

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<sup>2</sup> Examiners Douglas Owens, Tung X. Le, Rodney McDonald, Wilson Lee, Don Wong, and Tuyet T. Vo allowed U.S. Patents 7,147,759, 7,808,184, 7,811,421, 8,125,155, 6,853,142, 7,604,716, 6,896,775, 6,896,773, 6,805,779, and 6,806,652 over Mozgrin and Wang over nearly a decade from the time that the application for the '759 patent was filed on 9/30/2002 to the time that the '155 patent issued on 2/28/2012.

<sup>3</sup> Petition at pp. 14-60.

different structures and processes. Mozgrin teaches two different “[d]ischarge device configurations: (a) planar magnetron and (b) shaped-electrode configuration.”<sup>4</sup> Mozgrin further discloses a “square voltage pulse application to the gap.”<sup>5</sup> Wang discloses that a “target 14 is powered by narrow pulses of negative DC power supplied from a pulsed DC power supply 80, as illustrated in FIG. 1.”<sup>6</sup> Lantsman did not describe a pulsed power supply; it instead discloses two DC power supplies: “DC power supply 10,”<sup>7</sup> and “secondary DC power supply 32.”<sup>8</sup> Lantsman makes no mention of generating strongly ionized plasma.<sup>9</sup>

And the Petitioner sets forth no evidence that the structure and process of either Mozgrin or Wang would produce the particular apparatus for generating strongly-ionized plasma having an ionization source, an electrical pulse and feed gas to diffuse the strongly-ionized plasma, as recited in

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<sup>4</sup> Mozgrin, Ex. 1003 at Fig. 1 caption.

<sup>5</sup> *Id.* at p. 402, col. 2, ¶ 2.

<sup>6</sup> Wang, Ex. 1005, col. 5, ll. 18-22.

<sup>7</sup> Lantsman, Ex. 1004 at col, 4, l. 11.

<sup>8</sup> *Id.* at col. 4, l. 11.

<sup>9</sup> *See e.g., id.* at col. 4.

independent claim 1 of the '142 patent if either were somehow modified by a structure that does not even apply an electrical pulse or generate strongly-ionized plasma, like the structure disclosed in Lantsman.<sup>10</sup> That is, the Petitioner did not show that a “skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.”<sup>11</sup> The Board has consistently declined to institute proposed grounds of rejections in IPR proceedings when the Petition fails to identify any objective evidence such as experimental data, tending to establish that two different structures or processes can be combined.<sup>12</sup> Here, the Petitioner did not set forth any such objective evidence.<sup>13</sup> For this additional reason, there is not a reasonable likelihood that the Petitioner will prevail at trial with respect to at least one claim of the '142 patent.

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<sup>10</sup> See *e.g.*, Petition, pp. 14-60.

<sup>11</sup> *OSRAM Sylvania, Inc. v. Am Induction Techs., Inc.*, 701 F.3d 698, 706 (Fed. Cir. 2012).

<sup>12</sup> *Epistar, et al. v. Trustees Of Boston University*, IPR2013-00298, Decision Not To Institute, Paper No. 18 (P.T.A.B. November 15, 2103).

<sup>13</sup> See *e.g.*, Petition, pp. 14-60.

Third, the prior art in each of the Petitioner's proposed grounds of rejections are missing one or more limitations recited in the claims of the '142 patent such as i) "a gas line that supplies feed gas to the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the strongly ionized plasma," ii) "the gas line supplies additional feed gas that exchanges the weakly-ionized plasma while applying the electrical pulse across," and iii) "the power supply generates a constant power."

Fourth, Petitioner neglected to follow the legal framework for an obviousness analysis set forth long ago by the Supreme Court.<sup>14</sup> That framework requires consideration of the following factors: (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. The Board has previously warned that failure to identify differences between the cited art and the claims is a basis for denying a petition:

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<sup>14</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 399 (2007) ("While the sequence of these questions might be reordered in any particular case, the [Graham] factors define the controlling inquiry.")



A petitioner who does not state the differences between a challenged claim and the prior art, and relies instead on the Patent Owner and the Board to determine those differences based on the rest of the submission in the petition risks having the corresponding ground of obviousness not included for trial for failing to adequately state a claim for relief.<sup>15</sup>

The Petitioner ignored the Board’s warning by failing to identify the differences between the challenged claim and the prior art. That is, the Petitioner failed to identify the claim limitations that it believed are missing from the primary references (*i.e.*, Mozgrin and Wang) and are instead taught by the secondary references (*i.e.*, Lantsman).<sup>16</sup> Rather, Petitioner argued that the claim limitations are taught by “the combination of Mozgrin and Lantsman,” or “the combination of Wang and Lantsman,” leaving the Board to figure out whether the primary or secondary reference teaches the claim limitation.<sup>17</sup> Under this circumstance, it would be “inappropriate for the Board

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<sup>15</sup> *Liberty Mutual v. Progressive Casualty*, CBM-2012-00003, paper 7 at 2 – 3.

<sup>16</sup> *See e.g.*, Petition, pp. 18-60.

<sup>17</sup> *Id.* at pp. 28, 29, 30, 31, 33, 49, 50-53, and 57.

to take the side of the Petitioner to salvage an inadequately expressed ground

...”<sup>18</sup> On this additional basis, *inter partes* review should be denied.

Fifth, the Petition contains many redundant grounds of rejection.

Indeed, the Petitioner proposed two or more grounds of rejections for every challenged claim and did not set forth a compelling reason for why the Board should institute this proceeding on multiple, redundant grounds.<sup>19</sup>

In brief, the Petitioner failed to demonstrate that there is a reasonable likelihood that it will prevail with respect to at least one of the claims challenged in the petition for the four groups of reasons summarized in the table below:

Grounds	Reasons For Not Instituting a Proceeding
All	The references that are primarily relied upon by the Petitioner ( <i>i.e.</i> , Mozgrin and Wang) were already considered by the Examiner and overcome during the prosecution of the application that led to the issuance of the '142 patent.
All	The Petitioner failed to show that a skilled artisan would have had a reasonable chance of success of

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<sup>18</sup> *Liberty Mutual v. Progressive Casualty*, CBM-2012-00003, paper 8 at 14.

<sup>19</sup> Petition, pp. 14-60.

	achieving the claimed apparatus for generating strongly-ionized plasma having an ionization source, an electrical pulse and feed gas to diffuse the strongly-ionized plasma by combining the Lantsman structure that does not have an electrical pulse and does not generate strongly-ionized plasma with either the planar magnetron or shaped-electrode pulsed systems of Mozgrin or the small magnetron pulsed system of Wang.
All	The prior art, either alone or in combination, would not have taught all the claim limitations of independent claims 1 and 10 to a skilled artisan at the time of the invention.
All	The Petitioner failed to identify differences between the primary references ( <i>i.e.</i> , Mozgrin and Wang) and the claimed invention in the proposed obviousness rejections.
Grounds I, or II and III	Ground I using Mozgrin as a primary reference are redundant with Grounds II and III using Wang as a primary reference and Petitioner did not set forth a compelling reason for why the Board should institute this proceeding on multiple, redundant grounds.

For these reasons as expressed more fully below, the Board should deny the Petition.

## II. TECHNOLOGY BACKGROUND

### A. Overview Of Magnetron Sputtering Systems.

Sputtering systems generate and direct ions from plasma “to a target surface where the ions physically sputter target material atoms.”<sup>20</sup> Then, “[T]he target material atoms ballistically flow to a substrate where they deposit as a film of target material.”<sup>21</sup> “The plasma is replenished by electron-ion pairs formed by the collision of neutral molecules with secondary electrons generated at the target surface.”<sup>22</sup>

A planar magnetron sputtering system is one type of sputtering system.<sup>23</sup> “Magnetron sputtering systems use magnetic fields that are shaped to trap and to concentrate secondary electrons, which are produced by ion bombardment of the target surface.”<sup>24</sup> “The trapped electrons enhance the efficiency of the

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<sup>20</sup> Ex. 1001, col. 1, ll. 9-11.

<sup>21</sup> *Id.* at col. 1, ll. 11-13.

<sup>22</sup> *Id.* at col. 1, ll. 32-34.

<sup>23</sup> *Id.* at 1, ll. 36-54.

<sup>24</sup> *Id.* at col. 1, ll. 36-38.

discharge and reduce the energy dissipated by electrons arriving at the substrate.”

But prior art planar magnetron sputtering systems experienced “non-uniform erosion or wear of the target that results in poor target utilization.”<sup>25</sup> To address these problems, researchers increased the applied power and later pulsed the applied power.<sup>26</sup> But increasing the power increased “the probability of establishing an undesirable electrical discharge (an electrical arc) in the process chamber.”<sup>27</sup> And “very large power pulses can still result in undesirable electrical discharges and undesirable target heating regardless of their duration.”<sup>28</sup>

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<sup>25</sup> *Id.* at col. 2, ll. 57-59.

<sup>26</sup> *Id.* at col. 1, l. 60 to col. 2, l. 9.

<sup>27</sup> *Id.* at col. 2, ll. 63-67.

<sup>28</sup> *Id.* at col. 3, ll. 7-9.

- B. The '142 patent: Dr. Chistyakov invents a new apparatus containing an ionization source to generate weakly ionized plasma, an electrical pulse applied to the weakly ionized plasma to create strongly ionized plasma and a gas line to supply feed gas to the strongly-ionized plasma to diffuse the strongly-ionized plasma, and allow additional power to be absorbed by the strongly ionized plasma.**

To overcome the problems of the prior art, Dr. Chistyakov invented an apparatus containing an ionization source to generate weakly ionized plasma, an electrical pulse applied to the weakly ionized plasma to create strongly ionized plasma and a gas line to supply feed gas to the strongly-ionized plasma to diffuse the strongly-ionized plasma, and allow additional power to be absorbed by the strongly ionized plasma as recited in independent claim 1 and as illustrated in Fig. 2A of the '142 patent, reproduced below:

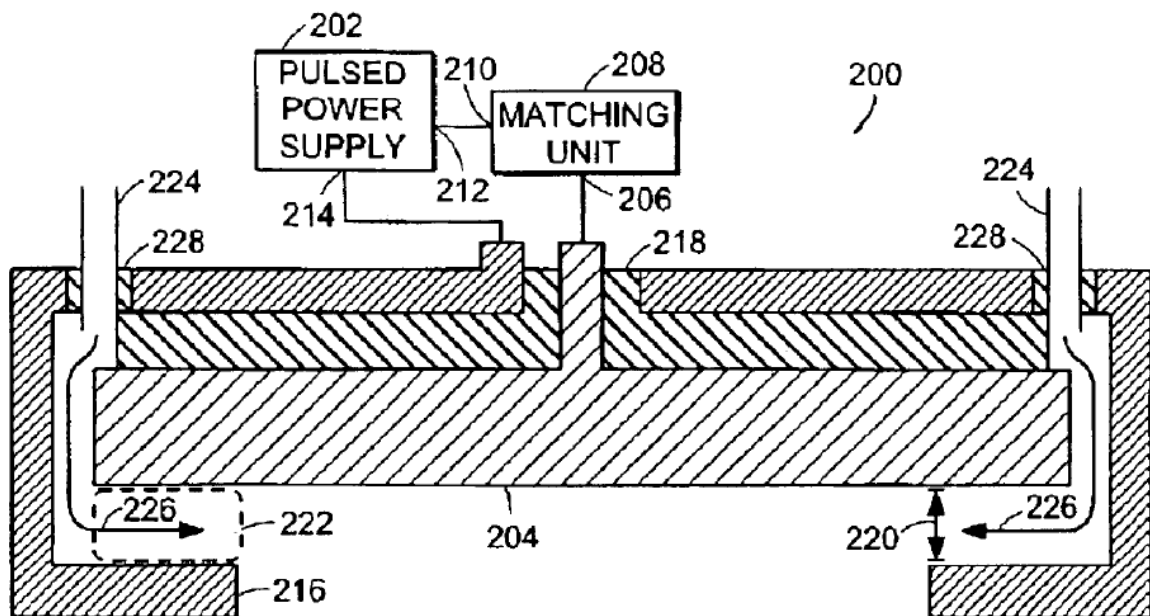


FIG. 2A

As illustrated by FIG. 2A, Dr. Chistyakov's apparatus includes either a pulsed power supply 202 or a direct current (DC) power supply (not shown) as a component in an ionization source that generates a weakly ionized plasma 232, an anode 216, a cathode 204, a pulsed power supply 202 that applies a high power pulse between the cathode 204 and the anode 216, and gas lines 224 providing feed gas 226 from a feed gas source. "The anode 216 is positioned so as to form a gap 220 between the anode 216 and the cathode 204 that is sufficient to allow current to flow through a region 222 between the anode 216 and the cathode 204."<sup>29</sup> "The gap 220 and the total volume of the region 222 are parameters in the ionization process."<sup>30</sup> "In one embodiment, the pulsed power supply 202 is a component in an ionization source that generates a weakly ionized plasma 232."<sup>31</sup> "In another embodiment, a direct current (DC) power supply (not shown) is used in an ionization source to generate and maintain the weakly-ionized or pre-ionized plasma 232."<sup>32</sup>

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<sup>29</sup> *Id.* at col. 4, ll. 34-37.

<sup>30</sup> *Id.* at col. 4, ll. 40-41.

<sup>31</sup> *Id.* at col. 5, ll. 5-7.

<sup>32</sup> *Id.* at col. 5, ll. 45-48.

“Forming the weakly-ionized or pre-ionized plasma 232 substantially eliminates the probability of establishing a breakdown condition in the chamber when high-power pulses are applied between the cathode 204 and the anode 216.”<sup>33</sup> In addition, “the high-power pulses generate a highly-ionized or a strongly-ionized plasma 238 from the weakly-ionized plasma 232.”<sup>34</sup>

In one embodiment, additional feed gas is supplied to exchange the weakly-ionized plasma while applying the electrical pulse:

Directly injecting the feed gas 226 between the cathode 204 and the anode 216 can increase the flow rate of the feed gas 226. This causes a rapid volume exchange in the region 222 between the cathode 204 and the anode 216, which permits a high-power pulse having a longer duration to be applied across the gap 220. The longer duration high-power pulse results in the formation of a higher density plasma.<sup>35</sup>

Moreover, “[i]n one embodiment, the strongly-ionized plasma 238 is transported through the region 222 by a rapid volume exchange of feed gas 226. As the feed gas 226 moves through the region 222, it interacts with the

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<sup>33</sup> *Id.* at col. 6, ll. 20-25.

<sup>34</sup> *Id.* at col. 7, ll. 23-25.

<sup>35</sup> *Id.* at col. 4, l. 64 – col. 5, l. 3.



moving strongly-ionized plasma 238 and also becomes strongly ionized from the applied high-power electrical pulse.<sup>36</sup> This technique of supplying feed gas to the strongly-ionized plasma diffuses the strongly-ionized plasma, and thereby allows additional power from the pulsed power supply to be absorbed by the strongly ionized plasma:

Transporting the strongly-ionized plasma 238 through the region 222 by a rapid volume exchange of the feed gas 226 increases the level and the duration of the power that can be applied to the 10 strongly-ionized plasma 238 and, thus, generates a higher density strongly-ionized plasma in the region 234.<sup>37</sup>

Thus, Dr. Chistyakov accomplished his breakthrough of generating a strongly-ionized plasma while reducing the probability of electrical breakdown by inventing a particular apparatus and method comprising an ionization source for generating weakly-ionized plasma, a pulsed power supply for applying an electrical pulse to the weakly-ionized plasma to generate a strongly-ionized plasma, and a gas line for supplying feed gas to diffuse the strongly ionized plasma to allow the plasma to absorb additional power.

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<sup>36</sup> *Id.* at col. 9, l. 66 – col. 10, l. 4.

<sup>37</sup> *Id.* at col. 10, ll. 6-11.

**C. The Petitioner Mischaracterized The File History.**

The Petitioner alleged that the claims of the '142 patent were allowed solely because the Applicant (*i.e.*, now the Patent Owner) “amended every independent claim to require ‘the weakly-ionized plasma reducing the probability of developing an electrical breakdown condition in the chamber’ or similar limitations.”<sup>38</sup> But this allegation is not true because the Applicant amended the claims to include additional limitations beyond those mentioned by the Petitioner including a limitation specifying that a power supply “supplies power to the weakly-ionized plasma through an electrical pulse ... the electrical pulse having a magnitude and a rise-time that is sufficient to increase the density of the weakly-ionized plasma.”<sup>39</sup> The Applicant also added a limitation specifying that a “gas line supplies feed gas to the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the strongly ionized plasma.”<sup>40</sup> That is, the claims of the '142 patent were allowed

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<sup>38</sup> Petition, p. 7.

<sup>39</sup> Exhibit 1008, Response to Office Action, March 8, 2004, p. 2 of 14.

<sup>40</sup> *Id.*

because of many claim limitations and not just because of the single limitation identified by the Petitioner.

In addition, the Petitioner also mischaracterized the file history of another patent that is related to the '142 patent, U.S. Patent 7,147,759, by alleging that the Patent Owner was wrong in stating that “Mozgrin does not teach ‘without forming an arc.’”<sup>41</sup> But this allegation is just not true for two main reasons. First, the Examiner stated that he allowed the '759 patent — not just because of the arc limitation — but because of the combination of many claim limitations:

Applicant's arguments filed May 2, 2006 have been fully considered and are deemed persuasive. Specifically, Claims 1-50 are allowable over the prior art of record because ... the applied prior art applied in the previous office action does not teach the claimed apparatus or method wherein an ionization source generates a weakly-ionized plasma proximate to the anode and cathode assembly and a power supply generating a voltage pulse that produces an electric field between the cathode assembly and the anode, the power supply being configured to generate the voltage pulse with an amplitude and a rise time that increases an excitation rate of ground state atoms that are present in the weakly-ionized plasma to create a multi-step ionization process

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<sup>41</sup> Petition, pp. 17-18.

that generates a strongly-ionized plasma, from the weakly ionized plasma, the multi-step ionization process comprising exciting the ground state atoms to generate excited atoms, and then ionizing the excited atoms within the weakly-ionized plasma without forming an arc discharge.<sup>42</sup>

Second, the Patent Owner (*i.e.*, the Applicant at that time), did not argue, as alleged by the Petitioner, that the claims were allowable solely because of the “without forming an arc” limitation; it instead argued, *inter alia*, that “there is no description in Mozgrin of a multi-step ionization process that first excites ground state atoms to generate excited atoms, and then ionizes the excited atoms without forming an arc discharge.”<sup>43</sup> That is, the Patent Owner argued that Mozgrin did not teach avoidance of an arc discharge during a particular process: the multi-step ionization process. In other words, the Petitioner mischaracterized the Patent Owner’s argument to the Examiner by truncating it and quoting only a small portion of it in the Petition.

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<sup>42</sup> IPR2014-00447, Exhibit 1415, Notice of Allowance, September 29, 2006, pp. 2-3.

<sup>43</sup> IPR2014-00447, Exhibit 1413, Response to Office Action, May 2, 2006, p. 13 (emphasis omitted).

Moreover, contrary to Petitioner's allegation, the Patent Owner did not mischaracterize Mozgrin because Mozgrin does not, in fact, teach that there is no arcing during the multi-stage ionization process (*e.g.*, while ionizing the excited atoms within the weakly-ionized plasma).<sup>44</sup> That is, Mozgrin does not teach the avoidance of all arcing during execution of the particular process that is identified in the claim.<sup>45</sup>

### **III. SUMMARY OF THE PETITIONER'S PROPOSED GROUNDS FOR REVIEW**

Confusingly, the Petition contains multiple, redundant grounds of rejection based on the same combination of references. In particular, for every ground of rejection using Mozgrin as a primary reference, there is a corresponding redundant ground using Wang as a primary reference. For the Board's convenience below is a summary of claim rejections proposed by the Petitioner:

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<sup>44</sup> IPR2014-00447, Patent Owner's Preliminary Response, Paper No. 11, § V.C.2.

<sup>45</sup> *Id.*

1. Claims 1, 3-10, 12, 15, 17-20 and 42: obvious in view of the combination of Mozgrin and Lantsman (Ground I);
2. Claims 1, 3-7, 9, 10, 12, 15, 19, 20 and 42: obvious in view of the combination of Wang and Lantsman (Ground II); and
3. Claims 8, 17 and 18: obvious in view of the combination of Wang, Lantsman and Mozgrin (Ground III).

#### **IV. PATENT OWNER'S CLAIM CONSTRUCTIONS.**

Under the Board's rules, any unexpired claim "shall be given its broadest reasonable construction in light of the specification of the patent in which it appears."<sup>46</sup> Under that construction, claim terms are to be given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire patent disclosure.<sup>47</sup> The customary meaning applies unless the specification reveals a special definition given to the claim

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<sup>46</sup> 37 C.F.R. § 42.100(b).

<sup>47</sup> *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc); *Research in Motion v. Wi-Lan*, Case IPR2013-00126, Paper 10 at 7 (P.T.A.B. June 20, 2013).

term by the patentee, in which case the inventor's lexicography governs.<sup>48</sup> Any term not construed below should be given its ordinary and customary meaning as would be understood by one of ordinary skill in the art. Patent Owner Zond proposes the following claim constructions for the purposes of this *inter partes* review proceeding.

**A. The construction of “weakly ionized plasma” and “strongly ionized plasma”**

The Petitioner's proposed constructions of the claim terms “strongly ionized plasma,” and “weakly ionized plasma” are wrong because they are not the broadest reasonable constructions consistent with the specification. In particular, the Petitioner's proposed construction of “strongly ionized plasma” as a “higher density plasma” is wrong because the proposed construction reads the claim term “ionized” out of the claim. That is, the Petitioner's proposed construction of “strongly ionized plasma” is incomplete because it does not specify what the term “density” refers to.

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<sup>48</sup> See *Phillips*, 415 F.3d at 1316 (“[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning that it would otherwise possess. In such cases, the inventor's lexicography governs.”).

The proper construction of “strongly ionized plasma” is “a plasma with a relatively high peak density of ions.” This proposed construction specifies that the term “density” refers to ions and therefore, is consistent with the claim language. Moreover, the proposed construction is also consistent with the Specification of the ’142 patent which refers to “strongly ionized plasma 238 [as] having a large ion density.”<sup>49</sup> In addition, the proposed construction is also consistent with the Specification of a related patent (*i.e.*, U.S. Patent 6,806,652) which states that “[t]he term ‘high-density plasma’ is also referred to as a ‘strongly-ionized plasma.’ The terms ‘high-density plasma’ and ‘strongly-ionized plasma’ are defined herein to mean a plasma with a relatively high peak plasma density.”<sup>50</sup>

For similar reasons, the proper construction of the claim term “weakly ionized plasma” is “a plasma with a relatively low peak density of ions.” In particular, the Specification of the ’652 Patent states that “[t]he term ‘weakly-ionized plasma’ is defined herein to mean a plasma with a relatively low peak

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<sup>49</sup> Exhibit 1001, ’142 patent, col. 9, ll. 43-44.

<sup>50</sup> U.S. Patent 6,806,652, col. 10, ll. 60-63.



plasma density. The peak plasma density of the weakly ionized plasma depends on the properties of the specific plasma processing system.”<sup>51</sup>

**V. THERE IS NO REASONABLE LIKELIHOOD OF PETITIONER  
PREVAILING AS TO A CHALLENGED CLAIM OF THE '142  
PATENT.**

*Inter partes* review cannot be instituted unless the Board determines that the Petition demonstrates that there is a reasonable likelihood that at least one of the claims challenged in the Petition is unpatentable.<sup>52</sup> Differences between the challenged claims and the prior art are critical factual inquiries for any obviousness analysis and must be explicitly set forth by the Petitioner.<sup>53</sup> The bases for rejection under 35 U.S.C. § 103 must be made explicit.<sup>54</sup> Thus, a Petition seeking to invalidate a patent as obvious must demonstrate that a “skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled

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<sup>51</sup> *Id.* at col. 8, ll. 55-52 (emphasis added).

<sup>52</sup> 37 C.F.R. § 42.108(c).

<sup>53</sup> *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966).

<sup>54</sup> MPEP § 2143.

artisan would have had a reasonable expectation of success in doing so.”<sup>55</sup>

The Petition’s evidence must also address every limitation of every challenged claim.

Here, the Board should decline to institute an *inter partes* review because (i) the Petition failed to demonstrate any motivation to combine the asserted references, (ii) the Petition failed to demonstrate that the prior art teaches every element of the challenged claims, (iii) there is a substantial amount of redundancy in the Petitioner’s proposed grounds of obviousness and the Petitioner did not set forth a compelling reason for why the Board should institute this proceeding on multiple, redundant grounds, and (iv) the Petition failed to provide a proper obviousness analysis because it did not discuss the differences between the claimed subject matter and the prior art.

**A. The Petition failed to demonstrate any motivation to combine.**

The Petitioner did not meet its statutory threshold for instituting a trial with respect to any of the three grounds because the Petitioner failed to demonstrate any motivation to combine. Generally, a party seeking to

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<sup>55</sup> *OSRAM Sylvania, Inc. v. Am. Induction Techs., Inc.*, 701 F.3d 698, 706 (Fed. Cir. 2012).

invalidate a patent as obvious must demonstrate that a “skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.”<sup>56</sup> This is determined at the time the invention was made.<sup>57</sup> This temporal requirement prevents the “forbidden use of hindsight.”<sup>58</sup> Rejections for obviousness cannot be sustained by mere

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<sup>56</sup> See *Proctor & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 995 (Fed. Cir. 2009) (“To decide whether risedronate was obvious in light of the prior art, a court must determine whether, **at the time of invention**, a person having ordinary skill in the art would have had ‘reason to attempt to make the composition’ known as risedronate and ‘a reasonable expectation of success in doing so.’”) (emphasis added).

<sup>57</sup> *Id.*

<sup>58</sup> See *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1379 (Fed. Cir. 2012) (“Indeed, where the invention is less technologically complex, the need for *Graham* findings can be important to ward against falling into the forbidden use of hindsight.”).

conclusory statements.<sup>59</sup> “Petitioner[s] must show some *reason* why a person of ordinary skill in the art would have thought to combine *particular* available elements of knowledge, as evidenced by the prior art, to reach the claimed invention.”<sup>60</sup> Inventions are often deemed nonobvious (and thus patentable) even when all of the claim elements are individually found in the prior art because an “invention may be a combination of old elements.”<sup>61</sup> The motivation to combine inquiry focuses heavily on “scope and content of the

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<sup>59</sup> See *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

<sup>60</sup> *Heart Failure Technologies, LLC v. Cardiokinetix, Inc.*, IPR2013-00183, Paper 12 at 9 (P.T.A.B. July 31, 2013) (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)) (emphasis in original).

<sup>61</sup> *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1321 (Fed. Cir. 2005).

prior art” and the “level of ordinary skill in the pertinent art” aspects of the *Graham* factors.<sup>62</sup> The Petition did not address either factor.

**1. Scope and content of prior art.**

Any obviousness analysis requires a consideration of the scope and content of the prior art and the differences between the prior art and the claims.<sup>63</sup> The Petition does not offer any explanation of the scope or content of the cited references. The proposed obviousness rejections of the challenged claims are based on the combinations of Mozgrin and Lantsman, and Wang and Lantsman. These references are summarized below.

**a. Lantsman – U.S. Pat. No. 6,190,512 (Ex. 1004)**

Lantsman relates to “a power supply circuit which reduces oscillations generated upon ignition of a plasma within a processing chamber.”<sup>64</sup>

Lantsman’s circuit has two power supplies: “[a] secondary power supply pre-ignites the plasma by driving the cathode to a process initiation voltage.

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<sup>62</sup> *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006) (“We further explained that the ‘motivation to combine’ requirement ‘[e]ntails consideration of both the ‘scope and content of the prior art’ and ‘level of ordinary skill in the pertinent art’ aspects of the *Graham* test.”).

<sup>63</sup> See MPEP § 2141.01, 2141.02.

<sup>64</sup> Lantsman, Ex. 1004, Abstract.

Thereafter, a primary power supply electrically drives the cathode to generate plasma current and deposition on a wafer.”<sup>65</sup>

Significantly, Lantsman does not disclose a pulsed power supply, any type of electrical pulse, or strongly-ionized plasma, let alone an “electrical pulse having a magnitude and a rise time that is sufficient to increase the density of the weakly-ionized plasma to generate strongly-ionized plasma,” as recited in claim 1 of the ‘142 patent. Rather, Lantsman’s power supply includes two DC power supplies: “DC power supply 10”<sup>66</sup> and “secondary DC power supply 32.”<sup>67</sup>

- b. Mozgrin – D.V. Mozgrin, et al, High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research, Plasma Physics Reports, Vol. 21, No. 5, pp. 400-409, 1995 (Ex. 1003).**

Mozgrin relates to “high-power quasi-stationary low-pressure discharge in a magnetic field.”<sup>68</sup> “Two noncontracted discharge regimes in crossed E

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<sup>65</sup> *Id.*

<sup>66</sup> *Id.* at col. 4, l. 11.

<sup>67</sup> *Id.* at col. 4, l. 19.

<sup>68</sup> Exhibit 1003, Mozgrin, p. 400, Abstract.

and H fields were studied.”<sup>69</sup> The study used two “[d]ischarge device configurations: (a) planar magnetron; (b) shaped-electrode configuration.”<sup>70</sup> The planar magnetron included “a plane cathode 120mm in diameter and a ring-shaped anode 160 mm in diameter.”<sup>71</sup> “The system with shaped electrodes involved to hollow axisymmetrical electrodes 120 mm in diameter separated by about 10mm, and immersed in a cusp-shaped magnetic field produced by oppositely directed multilayer coils.”<sup>72</sup>

Significantly, Mozgrin does not mention a gas line that supplies feed gas to the strongly ionized plasma with respect to the shaped electrode configuration or planar magnetron configuration.<sup>73</sup> Mozgrin also makes no mention of “feed gas diffusing the strongly ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the strongly ionized plasma,” as also recited in independent claim 1.<sup>74</sup>

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<sup>69</sup> *Id.*

<sup>70</sup> *Id.* at p. 401, Figs. 1a and 1b.

<sup>71</sup> *Id.* p. 400, col. 2, ¶ 4.

<sup>72</sup> *Id.* p. 401, col. 1, ¶ 2.

<sup>73</sup> *Id.*, pp. 400-409.

<sup>74</sup> *Id.*

Moreover, neither the shaped-electrode configuration nor the planar magnetron configuration teaches an “electrical pulse having a magnitude and a rise time that is sufficient to increase the density of the weakly –ionized plasma to generate strongly-ionized plasma,” as recited in claim 1.<sup>75</sup> That is, there is no suggestion in Mozgrin that the magnitude and rise time of an electrical pulse were chosen to generate the strongly-ionized plasma.<sup>76</sup>

**c. Wang – U.S. Patent No. 6,413,382 (Exhibit 1005).**

Wang teaches a “magnetron sputter reactor having a target that is pulsed with a duty cycle of less than 10% and preferably less than 1 % and further having a small magnetron of area less than 20% of the target area rotating about the target center, whereby a very high plasma density is produced during the pulse adjacent to the area of the magnetron.”<sup>77</sup> Wang further discloses that a “target 14 is powered by narrow pulses of negative DC power supplied from a pulsed DC power supply 80, as illustrated in FIG. 1. The pulse form is

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<sup>75</sup> *Id.*

<sup>76</sup> *Id.*

<sup>77</sup> Wang, Exhibit 1005 Abstract.



generically represented in the timing diagram of FIG. 4 and includes a periodic sequence of power pulse 82.”<sup>78</sup>

Significantly, Wang does not teach an “electrical pulse having a magnitude and a rise time that is sufficient to increase the density of the weakly-ionized plasma to generate strongly-ionized plasma,” as recited in claim 1. Indeed, Wang makes no mention whatsoever about the magnitude and rise time of an electrical pulse,<sup>79</sup> let alone any teaching of creating a pulse with a magnitude and rise time that achieves the particular effect of increasing the density of the weakly-ionized plasma to generate strongly-ionized plasma.<sup>80</sup> Rather, Wang describes the shape of power pulses throughout its disclosure.<sup>81</sup>

In addition, although Wang discloses a gas line, it does not teach that feed gas is supplied to the strongly ionized plasma.<sup>82</sup> Wang also does not teach “feed gas diffusing the strongly ionized plasma, thereby allowing additional

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<sup>78</sup> *Id.* at col. 5, ll. 18-22.

<sup>79</sup> *See e.g., id.* at col. 3, ll. 15-34.

<sup>80</sup> *See e.g., id.* at col. 5, ll. 18-22, FIGs. 4, 5, and 6.

<sup>81</sup> *See e.g., id.* at col. 5, ll. 18-22, FIGs. 4, 5, and 6.

<sup>82</sup> *See e.g., id.* at col. 4, ll. 5-6; col. 4, ll. 8-12; col. 4, ll. 51-55; and col. 7, ll. 3-49

power from the pulsed power supply to be absorbed by the strongly ionized plasma,” as also recited in independent claim 1.<sup>83</sup>

Moreover, Wang also does not teach the generation of “the weakly-ionized plasma reducing the probability of developing an electrical breakdown condition in the chamber,” as recited in claim 1. Rather, Wang indicates that its process forms an electrical breakdown condition (*e.g.*, arc discharges):

“Plasma ignition, particularly in plasma sputter reactors, has a tendency to generate particles during the initial arcing, which may dislodge large particles from the target or chamber.”<sup>84</sup> Wang further indicates that “particulates produced by arcing are much reduced.”<sup>85</sup> That is, although Wang mentions reducing the particulates produced by arcing, it does not indicate that the probability of arcing or electrical breakdown is reduced by generating weakly ionized plasma, as required by claim 1 of the ‘142 patent.

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<sup>83</sup> *Id.*

<sup>84</sup> *Id.* at col. 7, ll. 3-6.

<sup>85</sup> *Id.* at col. 7, l. 49.

**2. The Petitioner Fails To Show That It Would Have Been Obvious To Combine The DC Power System Without Pulses Of Lantsman With The Pulsed Power System Of Either Mozgrin or Wang.**

The Petition's motivation to combine is rooted in forbidden hindsight analysis that is based on its incorrect assumption regarding the level of ordinary skill in the art. To support its obviousness ground based on the combination of Mozgrin and Lantsman, the Petitioner asserts that "[o]ne of ordinary skill would have been motivated to combine Mozgrin and Lantsman."<sup>86</sup> The Petitioner even goes so far as to state that the "use of Lantsman's continuous gas flow in Mozgrin would have been a combination of old elements in which each element behaved as expected."<sup>87</sup> On the basis of this faulty foundation, the Petitioner erroneously concludes that it would have been obvious to combine Lantsman with Mozgrin to create the particular apparatus claimed in the '142 patent.<sup>88</sup>

But the Petitioner fails to provide any evidence whatsoever that the elements from Lantsman's system, which uses two DC power supplies instead

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<sup>86</sup> Petition, p. 26.

<sup>87</sup> *Id.* at 27.

<sup>88</sup> *Id.*

of a pulsed power supply and does not generate strongly ionized plasma, would perform in an expected way in the pulsed power systems of Mozgrin or the claimed apparatus of the '142 patent, which generates strongly ionized plasma from an electrical pulse and diffuses the strongly ionized plasma with feed gas to allow additional power from the pulsed power supply to be absorbed by the strongly ionized plasma.<sup>89</sup> That is, the Petitioner's argument fails to take into the consideration the substantial, fundamental differences between Lantsman's system and Mozgrin's system or the claimed apparatus of the '142 patent.

For example, Lantsman's circuit has two power supplies: "DC power supply 10"<sup>90</sup> and "secondary DC power supply 32."<sup>91</sup> Significantly, Lantsman does not disclose a pulsed power supply, or an electrical pulse.<sup>92</sup> In sharp contrast, Mozgrin discloses a "pulsed discharge supply unit."<sup>93</sup> Mozgrin

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<sup>89</sup> *See e.g., id.* pp. 26-27.

<sup>90</sup> Exhibit 1004, Lantsman, at col. 4, l. 11.

<sup>91</sup> *Id.* at col. 4, l. 19.

<sup>92</sup> *See e.g., Id.* at col. 4.

<sup>93</sup> Exhibit 1003, Mozgrin, p. 401, left col, ¶ 5.

further discloses that a “square voltage pulse was applied to the gap.”<sup>94</sup>

Significantly, a system that uses a pulsed discharge supply unit and a square voltage pulse, like Mozgrin’s system would operate very differently if it were modified to use two DC power supplies as taught by Lantsman.

In addition, Lantsman does not make any mention of generating strongly ionized plasma; it does not disclose the ion density of the plasma.<sup>95</sup> Because Lantsman does not disclose strongly-ionized plasma, it cannot possibly teach supplying feed gas to the strongly-ionized plasma to diffuse the strongly ionized plasma and allow it to absorb additional power, as required by the claims of the ‘142 patent. Moreover, Mozgrin makes no mention of a feed gas, let alone the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the strongly-ionized plasma.<sup>96</sup>

When the Board considered this very same type of unsupported argument for combining the teachings of different systems from different prior art references in *Epistar v. Boston University* (IPR2013-00298), it declined to

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<sup>94</sup> *Id.* at 401, right col. ¶ 2.

<sup>95</sup> See Exhibit 1004, Lantsman, cols. 4-7.

<sup>96</sup> See Exhibit 1003, Mozgrin, pp. 400-409.

institute the IPR.<sup>97</sup> The Board reasoned that “Petitioner does not show sufficiently that Manabe’s process conditions produce a similarly ‘polycrystalline’ GaN buffer layer, when gallium is selected over aluminum as a starting material.”<sup>98</sup> The Board further reasoned that “Petitioner identifies no objective evidence — for example, experimental data — tending to establish the structure of a GaN buffer layer grown under Manabe’s process conditions.”<sup>99</sup>

Here, as in *Epistar*, the Petitioner failed to provide experimental data or other objective evidence indicating that a skilled artisan would have been motivated to combine Lantsman’s dual DC power supply system with the pulsed power supply system of Mozgrin to achieve the claimed invention of the ‘142 patent and would have had a reasonable expectation of success of doing so.<sup>100</sup> In particular, Petitioner failed to provide any experimental

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<sup>97</sup> *Epistar, et al. v. Trustees Of Boston University*, IPR2013-00298, Decision Not To Institute, Paper No. 18 (P.T.A.B. November 15, 2103).

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> *OSRAM Sylvania, Inc. v. Am Induction Techs., Inc.*, 701 F.3d 698, 706 (Fed. Cir. 2012).

evidence indicating that a skilled artisan would have had a reasonable expectation of success of achieving a system that supplies feed gas to diffuse strongly ionized plasma to allow it to absorb additional power as claimed in the '142 patent by modifying Mozgrin, which makes no mention of a feed gas, with a system that does not even generate strongly-ionized plasma, like Lantsman's system.

Similarly, the Petitioner also failed to provide any objective evidence that a skilled artisan would have been motivated to combine Lantsman with Wang. Lantsman also differs substantially from Wang because Wang discloses that a "target 14 is powered by narrow pulses of negative DC power supplied from a pulsed DC power supply 80, as illustrated in FIG. 1. The pulse form is generically represented in the timing diagram of FIG. 4 and includes a periodic sequence of power pulse 82."<sup>101</sup> The Petitioner failed to provide any objective evidence that a skilled artisan would have been motivated to modify Wang's pulsed power system with a system that uses DC power supplies, like Lantsman's system.

Moreover, Petitioner failed to provide any experimental evidence indicating that a skilled artisan would have had a reasonable expectation of

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<sup>101</sup> *Id.* at col. 5, ll. 18-22.

success of achieving a system that supplies feed gas to diffuse strongly ionized plasma to allow it to absorb additional power as claimed in the '142 patent by modifying Wang, which makes no mention of diffusing strongly ionized plasma with feed gas, with a system that does not even generate strongly-ionized plasma (e.g., Lantsman's system).

For these reasons alone, the Board should not institute this IPR proceeding.

**B. The Petition fails to demonstrate how the alleged combinations teach every element of the challenged claims.**

The Petition must identify with particularity each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim.<sup>102</sup> Per 37 C.F.R. § 42.22(a), each petition must include a statement of the precise relief requested and a full statement of the reasons for the relief requested, including a detailed explanation of the significance of the evidence including material facts, the governing law, rules, and precedent. Under 37 C.F.R. § 42.104(b)(4), the petition must specify where **each element** of a challenged claim is found in the prior art patents or printed publications. And 37 C.F.R. § 104(b)(5) requires the

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<sup>102</sup> 35 U.S.C. § 312(a)(3).



Petition to explain the relevance of the evidence supporting the challenge, including citing specific evidence that supports the challenge.

1. **The cited references do not teach “a gas line that supplies feed gas to the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the strongly ionized plasma,” as recited in independent claim 1 and as similarly recited in independent claim 10.**

The Petitioner provided argument purporting to map the claim limitation quoted above to i) the combination of Mozgrin and Lantsman and ii) the combination of Wang and Lantsman.<sup>103</sup> The Petitioner asserts that the combination of Mozgrin and Lantsman teach this claim limitation because “[u]se of gas feed lines in sputtering chambers was notoriously well known before the ‘142 Patent.”<sup>104</sup> The Petitioner goes on to argue that “Lantsman explicitly discloses supplying the feed gas during the entirety of the plasma processing.”<sup>105</sup> But this claim limitation requires much more than supplying feed gas during plasma processing; it requires supplying “feed gas *to the*

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<sup>103</sup> Petition, pp. 14-30, 39-51.

<sup>104</sup> *Id.* at 21.

<sup>105</sup> *Id.* at 24.

*strongly-ionized plasma*, the feed gas diffusing the strongly-ionized plasma.”<sup>106</sup>

And Lantsman makes no mention of a generating a strongly ionized plasma and therefore, cannot possibly teach supplying feed gas to strongly-ionized plasma.

Apparently realizing that Mozgrin and Lantsman, either alone or in combination, do not teach this claim limitation, the Petitioner asserted that “[I]t would have been obvious to one of ordinary skill to continue to add and remove (i.e., exchange) the feed gas in Mozgrin during production of the strongly-ionized plasma.”<sup>107</sup> The Petitioner then argues in support of its position that “[S]uch exchange of the feed gas into and out of Mozgrin’s chamber would have both diffused the strongly-ionized plasma and allowed additional power from Mozgrin’s plasma repeating voltage pulses to be absorbed by the strongly-ionized plasma as required by claim 1.”<sup>108</sup>

But this argument is classic hindsight analysis because the motivation provided by the Petitioner in its argument for modifying Mozgrin to supply feed gas to the strongly-ionized plasma is the same as that which is provided in

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<sup>106</sup> Exhibit 1001, ’142 patent, col. 20, ll. 48-50.

<sup>107</sup> Petition p. 23.

<sup>108</sup> *Id.* at 23-24.

the claim: to diffuse the strongly-ionized plasma to allow it to absorb additional power from the pulsed power supply. That is, the Petitioner's reason for why one of ordinary skill in the art would have added this claimed feature to Mozgrin is *the same as the reason given in the '142 patent for including this feature*.

Clearly the combination of Mozgrin and Lantsman would not have taught or suggested this claim limitation to a person of ordinary skill in the art *unless that person would have used the '142 patent as a blueprint* for modifying Mozgrin and Lantsman.

The Petitioner relied on the very same hindsight to argue that the combination of Wang and Lantsman teaches supplying feed gas to diffuse the strongly-ionized plasma:

it would have been obvious to one of ordinary skill to continue to exchange the feed gas into and out of Wang's chamber during production of the strongly-ionized plasma (i.e., during the application of the high peak power PP pulses). Such exchange of the feed gas into and out of Wang's chamber would have both *diffused the strongly-ionized plasma and allowed additional power from Wang's repeating voltage pulses to be absorbed by the strongly-ionized plasma*.<sup>109</sup>

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<sup>109</sup> Petition, p. 46 (emphasis added) (internal citations omitted).

That is, the motivation to combine Wang and Lantsman emphasized above that was provided by the Petitioner is *the very same reason provided in the '142 patent for including this feature in the claimed apparatus*. Clearly, a skilled artisan would not have been motivated to modified Wang to include the claimed feature *without the benefit of hindsight provided by the '142 patent*.

For this additional reason, the Petitioner has not demonstrated that there is a reasonable likelihood that it would prevail with respect to Grounds I – III.

- 2. The cited references do not teach a “the gas line supplies additional feed gas that exchanges the weakly-ionized plasma while applying the electrical pulse across,” as recited in claim 3 and as similarly recited in claim 12.**

There is no dispute that Mozgrin, Wang and Lantsman do not state that feed gas exchanges the weakly-ionized plasma while applying the electrical pulse across.<sup>110</sup> Nonetheless, the Petition includes an argument purporting to map the claim limitation quoted above to i) the combination of Mozgrin and Lantsman and ii) the combination of Wang and Lantsman.<sup>111</sup>

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<sup>110</sup> See e.g., Petition, pp. 30-31, and 51-52.

<sup>111</sup> *Id.*

In particular, the Petitioner argued that “Lantsman teaches supplying feed gas during the entirety of plasma processing.”<sup>112</sup> But this claim limitation requires much more than supplying feed gas that exchanges weakly-ionized plasma; it requires supplying feed gas that “exchanges the weakly-ionized plasma *while applying the electrical pulse across*.”<sup>113</sup> And Lantsman does not disclose a pulsed power supply; it instead discloses only two DC power supplies.<sup>114</sup> That is, Lantsman cannot possibly teach supplying feed gas to exchange weakly-ionized plasma while applying the electrical pulse because Lantsman does not disclose an electrical pulse.

Petitioner further argued that “one of ordinary skill would have also added feed gas to the plasma in Mozgrin’s region 1.”<sup>115</sup> But as shown by Fig. 3 of Mozgrin reproduced below, a pulse is not applied in Region 1:

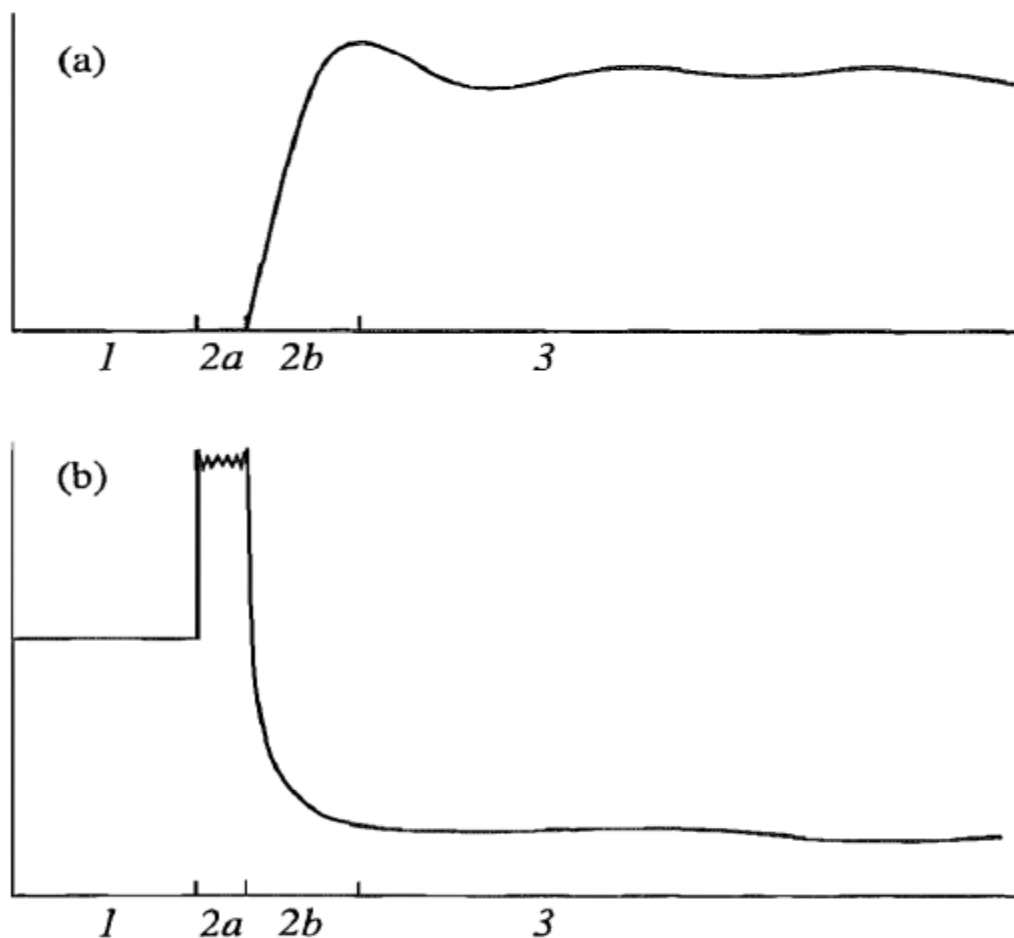
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<sup>112</sup> Petition, p. 30.

<sup>113</sup> Ex. 1001, ’142 patent, col. 20, ll. 42-44.

<sup>114</sup> *Supra*, § V.A.1.a.

<sup>115</sup> Petition, p. 31.



**Fig. 3.** Oscillograms of (a) current and (b) voltage of the quasi-stationary discharge (50  $\mu$ s per div., 180 A per div., 180 V per div.).

That is, even if feed gas were added to the plasma during Mozgrin's Region 1, Mozgrin would still not teach adding feed gas while applying an electrical pulse because no pulse of any kind is applied in Region 1.

With respect to Wang, Petitioner argued that "[O]ne of ordinary skill would have added feed gas during application of Wang's background power,

P<sub>B</sub>.<sup>116</sup> But even if a skilled artisan would have added feed gas during application of Wang's background power, P<sub>B</sub>, as alleged by the Petitioner, Wang would still not have taught the claim limitation at issue because the claim limitation requires adding feed gas while applying an electrical pulse and the background power P<sub>B</sub> is not a pulse.<sup>117</sup> Rather, the "background power level P<sub>B</sub> [is] between pulses."<sup>118</sup>

For these reasons, Mozgrin, Lantsman and Wang, either alone or in combination, would not have taught or suggested supplying "additional feed gas that exchanges the weakly-ionized plasma while applying the electrical pulse across," as recited in claim 3 and as similarly recited in claim 12. Accordingly, the Petitioner has not demonstrated that there is a reasonable likelihood that it would prevail with respect to claims 3 or 12. (*i.e.*, proposed Grounds I and II).

**3. The cited references do not teach a "a power supply that supplies power to the weakly-ionized plasma though an electrical pulse applied across the weakly-ionized plasma," and**

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<sup>116</sup> *Id.* at 52.

<sup>117</sup> Exhibit 1005, Wang, col. 7, l. 15.

<sup>118</sup> *Id.*

**“the power supply generates a constant power,” as required by dependent claim 4.**

The Petition includes argument purporting to map the claim limitations quoted above to the combination of Mozgrin and Lantsman.<sup>119</sup>

In particular, the Petitioner argued that “Lantsman teaches that power supplies that generate constant power were well known.”<sup>120</sup> But this claim limitation requires much more than generating constant power. In particular, claim 4 further defines the power supply that is recited in independent claim 1, from which claim 4 depends. Together, claims 4 and 1 require a power supply that “supplies power to the weakly-ionized plasma though an electrical pulse applied across the weakly-ionized plasma,”<sup>121</sup> and “generates a constant power.”<sup>122</sup> And Lantsman does not make any mention of a power supply that generates an electrical pulse, let alone one that does so with a constant power.<sup>123</sup> That is, Lantsman cannot possibly teach a power supply that

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<sup>119</sup> Petition, pp. 31-33.

<sup>120</sup> *Id.*, p. 32.

<sup>121</sup> Exhibit 1001, ‘142 patent, col. 20, ll. 42-43.

<sup>122</sup> *Id.* at col. 20, l. 62.

<sup>123</sup> *Supra*, § V.A.1.a.



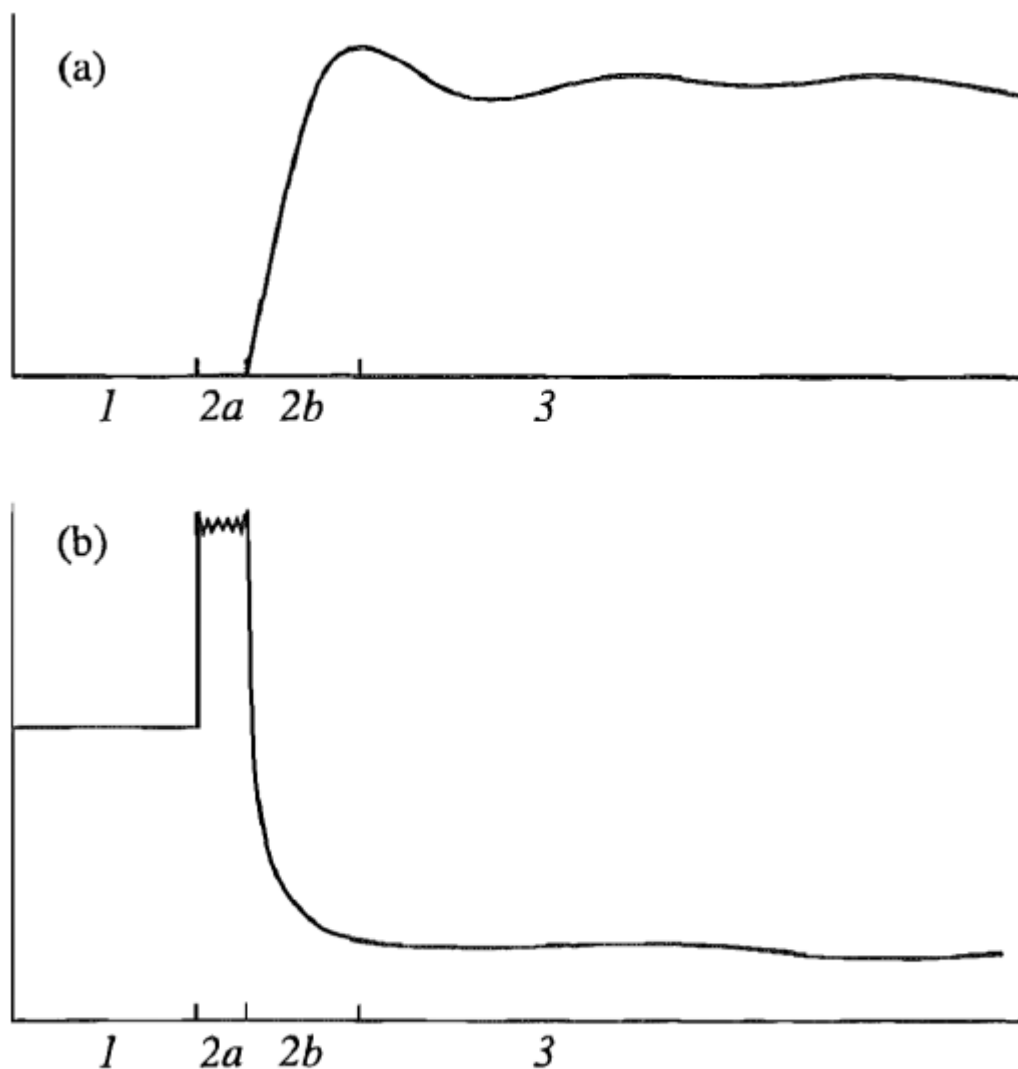
supplies power to the weakly-ionized plasma though an electrical pulse and does so with a constant power because it does not even mention any type of electrical pulse.<sup>124</sup>

Petitioner further argued that “[A]s shown [by Fig. 3], the power applied to the plasma in Mozgrin’s region 3 is constant (i.e., the voltage and current are both constant in that region).”<sup>125</sup> But as shown by Fig. 3 of Mozgrin reproduced below, neither the voltage (*i.e.*, plot 3b) nor current (*i.e.*, plot 3a) is constant in region 3:

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<sup>124</sup> *Id.*

<sup>125</sup> *Id.* at 32.



**Fig. 3.** Oscillograms of (a) current and (b) voltage of the quasi-stationary discharge (50  $\mu$ s per div., 180 A per div., 180 V per div.).

That is, both the current and voltage shown in Figs. 3(a) and 3(b) respectively are fluctuating, wavy lines in Region 3. As is well known, the current and voltage would appear as straight, horizontal lines if they were constant.

For these reasons, Mozgrin and Lantsman, either alone or in combination, would not have taught or suggested a power supply that supplies constant power to the weakly-ionized plasma though an electrical pulse applied across the weakly-ionized plasma, as required by claim 4 when read in conjunction with the claim from which it depends, claim 1. Accordingly, the Petitioner has not demonstrated that there is a reasonable likelihood that it would prevail with respect to claim 4.

**C. The Petition Failed to Identify Any Compelling Rationale for Adopting Redundant Grounds of Rejection Under Both Mozgrin and Wang.**

The Petitioner proposed two sets of grounds for rejection: one set using Mozgrin as the primary reference and another set using Wang as the primary reference.<sup>126</sup> In the first set, Petitioner proposed in Ground I that “claims 1, 3-10, 12, 15, 17-20 and 42 are obvious in view of the combination of Mozgrin and Lantsman.”<sup>127</sup> In the second set, Petitioner proposed in Ground II that “Claims 1, 3-7, 9, 10, 12, 15, 19, 20 and 42 are obvious in view of the

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<sup>126</sup> Petition, pp. 14-60.

<sup>127</sup> *Id.* at 14-39.

combination of Wang and Lantsman,”<sup>128</sup> and in Ground III that “claims 8, 17 and 18 are obvious in view of the combination of Wang, Lantsman and Mozgrin.”<sup>129</sup>

The Petitioner’s proposed grounds have two types of redundancies that have been prohibited by the Board: horizontal redundancy and vertical redundancy.<sup>130</sup> Horizontal redundancy “involves a plurality of prior art references applied not in combination to complement each other but as distinct and separate alternatives.”<sup>131</sup> The Petition has horizontal redundancy because it includes grounds proposing the rejection of claims 1, 3-7, 9, 10, 12, 15, 19, 20 and 42 for two different, alternate, combinations of references: i) Mozgrin and Lantsman, and ii) Wang and Lantsman.<sup>132</sup>

Vertical redundancy “involves a plurality of prior art applied both in partial combination and in full combination. In the former case, fewer

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<sup>128</sup> *Id.* at 39-58.

<sup>129</sup> *Id.* at 58-60.

<sup>130</sup> *Liberty Mutual Insurance Company v. Progressive Casualty Insurance Company*, CBM-2012-00003, Paper No. 8 (P.T.A.B. October 25, 2012).

<sup>131</sup> *Id.* at 3.

<sup>132</sup> Petition, pp. 14-58.

references than the entire combination are sufficient to render a claim obvious, and in the latter case the entire combination is relied on to render the same claim obvious.”<sup>133</sup> The Petition has vertical redundancy because it includes grounds proposing the rejection of claims 8, 17 and 18 for i) a partial combination of references (*i.e.*, Mozgrin and Lantsman) and ii) a full combination of references (*i.e.*, Mozgrin, Lantsman and Wang).<sup>134</sup>

The Board has made clear that in order to ensure “the just, speedy, and inexpensive resolution of every proceeding,” it will not institute *inter partes* review proceedings on cumulative grounds.<sup>135</sup> Indeed, the Board has instructed parties that it will not “authorize inter partes review on certain unpatentability challenges . . . [where] the challenges appear to rely on the same prior art facts as other challenges for which inter partes review had been authorized.”<sup>136</sup> “In other words, considering multiple rejections for the same

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<sup>133</sup> *Liberty Mutual Insurance Company*, p. 3.

<sup>134</sup> Petition, pp. 51-60.

<sup>135</sup> *Illumina, Inc. v. Trustees of Columbia Univ.*, IPR2012-00006, Paper 43 (P.T.A.B. May 10, 2013) (*citing* 37 C.F.R § 42.1(b)).

<sup>136</sup> *Id.*

unpatentability issue would unnecessarily consume the time and resources of all parties involved.”<sup>137</sup>

To avoid dismissal of a proposed ground of unpatentability, a petitioner must “provide a meaningful distinction between the different, redundant rejections.”<sup>138</sup> Where multiple references have been cited for the same facts, it is not enough for a petitioner to argue that the cited references are not identical, or to “speculate[] that in certain publications an element may be more clearly set forth in one publication rather than another.”<sup>139</sup> Rather, a petitioner must provide an adequate explanation as to the differences between the references and “how this difference would impact the unpatentability challenge.”<sup>140</sup>

Here, Petitioner did not set forth any such explanation or rationale. Indeed, the portions of Mozgrin cited by Petitioner have essentially the same teachings as the corresponding portions that the Petitioner cited in Wang.<sup>141</sup>

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<sup>137</sup> *Id.*

<sup>138</sup> *Id.*

<sup>139</sup> *Id.*

<sup>140</sup> *Id.*

<sup>141</sup> Petition, 18-58.

For independent claim 1, for example, Petitioner cited to a power supply as the claimed ionization source for both Mozgrin and Wang.<sup>142</sup> For the same claim, Petitioner referenced an exchange of gas for both Mozgrin and Wang.<sup>143</sup>

Petitioner failed to explain how Mozgrin differs from Wang or how any consideration of the combinations that use Mozgrin as the primary reference for claims 1, 3-10, 12, 15, 17-20 and 42 would impact these proceedings differently than a consideration of the combinations that use Wang as the primary reference.<sup>144</sup> Petitioner also failed to explain why the reliance on only Mozgrin and Lantsman for claims 8, 17 and 18 may be the stronger assertion as applied in certain instances and why the reliance on Mozgrin, Lantsman, and Wang for claims 8, 17, and 18 may be the stronger assertion in other instances.<sup>145</sup>

That is, nothing in Petitioner's analysis of the claims suggests that the combinations using Mozgrin would (or even could) be more determinative of

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<sup>142</sup> *Id.* at 16-17 and 40-42.

<sup>143</sup> *Id.* at 21-23 and 44-48.

<sup>144</sup> *Id.*, at 14-60.

<sup>145</sup> *Id.* at 51-60.

an outcome of these proceedings than the combinations using Wang.<sup>146</sup>

Instead, all Petitioner has done is to propose two redundant sets of rejections (*i.e.*, one with Mozgrin as the primary reference and the other set with Wang as the primary reference), and request institution of a patent trial on both sets of proposed rejections.<sup>147</sup> As explained above, the Board has consistently held that such a request will not suffice to preclude dismissal of proposed challenges on grounds of redundancy.

Accordingly, Petitioner's proposed ground of unpatentability using Mozgrin as the primary reference (*i.e.*, Ground I) is redundant over the proposed grounds of unpatentability using Wang as the primary reference (*i.e.*, Grounds II and III). For this reason, the Board should deny either proposed Ground I or proposed Grounds II and III.

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<sup>146</sup> *Id.* at 14-60.

<sup>147</sup> *Id.*



**D. The Petition failed to set forth a proper obviousness analysis.**

The Petitioner neglected to follow the legal framework for an obviousness analysis set forth long ago by the Supreme Court.<sup>148</sup> That framework requires consideration of the following factors: (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. The Board has previously warned that failure to identify differences between the cited art and the claims is a basis for denying a petition:

A petitioner who does not state the differences between a challenged claim and the prior art, and relies instead on the Patent Owner and the Board to determine those differences based on the rest of the submission in the petition risks having the corresponding ground of obviousness not included for trial for failing to adequately state a claim for relief.<sup>149</sup>

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<sup>148</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 399 (2007) (“While the sequence of these questions might be reordered in any particular case, the [Graham] factors define the controlling inquiry.”)

<sup>149</sup> *Liberty Mutual v. Progressive Casualty*, CMB-2012-00003, paper 7 at 2 – 3.

The Petitioner ignored the Board's warning by failing to identify the differences between the challenged claim and the prior art. That is, the Petitioner failed to identify the claim limitations that it believed are missing from the primary references (*i.e.*, Mozgrin and Wang) and that it believed are instead taught by the secondary reference (*i.e.*, Lantsman). Rather, Petitioner argued that the claim limitations are taught by "the combination of Mozgrin and Lantsman," or "the combination of Wang and Lantsman," leaving the Board to figure out whether the primary or secondary reference teaches the claim limitation.<sup>150</sup>

This technique obscures the arguments, forcing the Patent Owner to "conjure up arguments against its own patent."<sup>151</sup> The Board has previously warned Petitioners against this practice:

We address only the basis, rationale, and reasoning put forth by the petitioner and resolve all vagueness and ambiguity in Petitioner's arguments against the Petitioner. ... It would be unfair to expect the Patent owner to conjure up arguments against its own patent, and just as inappropriate for the Board to take the

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<sup>150</sup> See *e.g.*, Petition, pp. 28, 29, 30, 31, 33, 49, 50-53, and 57.

<sup>151</sup> *Liberty Mutual v. Progressive Casualty*, CMB-2012-00003, paper 8 at 14 - 15.

side of the Petitioner to salvage an inadequately expressed ground

... ”<sup>152</sup>

On this additional basis, *inter partes* review based on obviousness should be denied.<sup>153</sup>

## VI. CONCLUSION

In an attempt to show obviousness, the Petitioner is forced to argue that a person of ordinary skill in the art could have easily combined the teachings of Lantsman with either Mozgrin or Wang to yield the claimed invention of the ‘142 patent. But this argument fails because the Petitioner did not present any objective evidence whatsoever that the elements from Lantsman’s system, which uses two DC power supplies instead of a pulsed power supply and does not generate strongly ionized plasma, would perform in an expected way in the pulsed power systems of Mozgrin, Wang or the claimed apparatus of the ‘142 patent, which generates strongly ionized plasma from an electrical pulse and diffuses the strongly ionized plasma with feed gas to allow additional power from the pulsed power supply to be absorbed by the strongly ionized plasma.

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<sup>152</sup> *Id.*

<sup>153</sup> *Liberty Mutual v. Progressive Casualty*, CMB-2012-00003, paper 7 at 2 – 3; paper 8 at 14-15.

That is, the Petitioner's argument fails to take into the consideration the substantial, fundamental differences between Lantsman's system and Mozgrin's system, Wang's system, and the system of the '142 patent.

Moreover, the prior art references in each of the Petitioner's proposed grounds of rejections do not teach or suggest one or more limitations recited in the claims of the '142 patent such as i) "a gas line that supplies feed gas to the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the strongly ionized plasma," ii) "the gas line supplies additional feed gas that exchanges the weakly-ionized plasma while applying the electrical pulse across," and iii) "the power supply generates a constant power."

Further, the ground that uses Mozgrin as a reference (*i.e.*, Ground I) is redundant over the grounds of unpatentability using Wang as the primary reference (*i.e.*, Grounds II - III) because the Petitioner failed to provide an adequate explanation as to the differences between the references and how the differences would impact the unpatentability challenge.

In addition, the Petitioner also did not set forth a proper obviousness analysis because it did not discuss the differences between the prior art and the claimed invention. That is, the Petitioner failed to identify the claim

limitations that it believed are missing from the primary references (*i.e.*, Mozgrin and Wang) and are instead taught by the secondary references (*i.e.*, Lantsman). Rather, Petitioner argued that the claim limitations are taught by the combination of references, leaving the Board to figure out which reference teaches which claim limitation. Under this circumstance, it would be “inappropriate for the Board to take the side of the Petitioner to salvage an inadequately expressed ground ...” On this additional basis, *inter partes* review based on obviousness should be denied.

For these reasons and all the reasons expressed herein, the Board should deny all the proposed Grounds of unpatentability in the Petitioner’s request to institute *inter partes* review of the ’142 patent.

Date: July 24, 2014

Respectfully Submitted,

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**CERTIFICATE OF SERVICE**

Under 37 C.F.R. §§ 42.6(e), this is to certify that I served a copy of the foregoing ZOND, LLC'S PATENT OWNER PRELIMINARY RESPONSE PURSUANT TO 37 C.F.R. § 42.107(A) via email on July 24, 2014 to Petitioner's counsel of record at the following email addresses:

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