

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GLOBALFOUNDRIES U.S., INC., GLOBALFOUNDRIES DRESDEN  
MODULE ONE LLC & CO. KG, GLOBALFOUNDRIES DRESDEN  
MODULE TWO LLC & CO. KG, and THE GILLETTE COMPANY,

Petitioners

v.

ZOND, LLC

Patent Owner

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*Inter Partes* Review Case No. IPR2014-01089<sup>1</sup>

Patent 6,806,652

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**PATENT OWNER'S OBSERVATIONS ON CROSS-EXAMINATION  
OF PETITIONER'S REPLY WITNESS**

**37 C.F.R. §42.70**

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<sup>1</sup> Case IPR2014-01004 has been joined with the instant proceeding.

Pursuant to 37 C.F.R. §42.70(a), Patent Owner, Zond, LLC, hereby submits its observations on cross-examination of Dr. Kortshagen, whose Declaration was submitted by Petitioners with their Reply Brief filed June 26, 2015. Dr. Kortshagen's cross-examination was conducted by deposition on July 2, 2015. Exhibit 2004 is a transcript of that deposition, and is used as the basis for the present observations.

**1. Dr. Kortshagen Testified that Mozgrin's Regions 2 and 3 Both Represent Areas of High-Density Plasma.**

Claim 35 of the '652 patent requires "means for super-ionizing the initial plasma ... **thereby generating a high-density plasma.**"<sup>2</sup> Dr. Kortshagen testified that region 1 of Mozgrin's Fig. 4 is representative of such an initial plasma created by a preexcitation unit.<sup>3</sup> Dr. Kortshagen further testified that region 2 of Mozgrin's Figure 4 represents an area of high-density plasma,<sup>4</sup> and that region 3 of Mozgrin's Figure 4 also represents an area of high-density

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<sup>2</sup> *Ex. 1001* at 36:20 -22.

<sup>3</sup> *Ex. 2004* at 22:16-24:18 (testifying that region 1 shown in *Mozgrin's* Figure 4 represents a pre-ionization stage, with an initial plasma having a density in the range  $10^7 - 10^9 \text{ cm}^{-3}$ ).

<sup>4</sup> *Id.* at 26:3-21; 28:7-17.

plasma.<sup>5</sup> This testimony is relevant because it contradicts Petitioner’s argument that Mozgrin teaches “means for **super-ionizing the initial plasma ... thereby generating a high-density plasma.**”<sup>6</sup>

In an attempt to show “super-ionization” of the initial plasma, Dr. Kortshagen and Petitioners rely on computations that discuss the plasma densities during a transition from Mozgrin’s region 2 to region 3.<sup>7</sup> For example, Dr. Kortshagen states that ““for the discharge transit from regime 2 to regime 3 . . . the ionization degree  $\alpha = n_e / (n_g + n_i)$  ranges from  $\alpha \approx 1$  ( $p = 0.01$  torr) to  $\alpha \approx 0.7$  ( $p = 1$  torr).”<sup>8</sup> However, Dr. Korshagen’s deposition testimony reveals that such a transition is *not* super-ionizing *the initial plasma to thereby generate a high density plasma*, as required by claim 35, rather it is further ionizing an already high-density plasma. That is, Dr. Kortshagen’s reliance on the densities reported by Mozgrin for a “discharge transit from regime 2 to regime 3” do not support “converting at least 75% of the neutral

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<sup>5</sup> *Id.* at 28:19 – 29:8.

<sup>6</sup> Reply Brief at 2 *et seq.*

<sup>7</sup> *Ex. 1216* at ¶ 31; Reply Brief at 11 - 13, 20 - 21.

<sup>8</sup> *Ex. 1216* at ¶ 31 quoting *Mozgrin* at 407, left col. ¶ 2 and right col. ¶ 3 (emphasis in original).

atoms in the initial plasma into ions,”<sup>9</sup> as the Board has determined is required by the claim. Rather, the “discharge transit from regime 2 to regime 3” represents ionization of an already dense plasma, not ionization of an initial plasma to thereby generate a high density plasma.

**2. Dr. Kortshagen Testified that He Could Not Determine Whether Iwamura’s Preexcitaiton Unit Generated a Weakly-Ionized Plasma.**

During cross-examination, Dr. Kortshagen testified that he could not determine whether Iwamura’s pre-excitation unit creates a weakly-ionized plasma as defined in the ‘652 Patent.<sup>10</sup> This testimony is relevant because it contradicts Petitioner’s argument that claim 35 is obvious in view of the cited references.<sup>11</sup>

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<sup>9</sup> *Globalfoundries U.S., Inc. et al. v. Zond, LLC*, IPR2014-01088, Paper 16, p. 11 (P.T.A.B. Jan. 6, 2015).

<sup>10</sup> *Ex. 2004* at 54:2-10.

<sup>11</sup> *Pet.* at 54 *et seq.*

**3. Dr. Kortshagen's Testimony Confirms that Iwamura's Objective was to Treat an Object with "Active" Neutral Gas Atoms or Molecules, While Reducing the Risk of Damage by Ions.**

In his testimony,<sup>12</sup> Dr. Kortshagen confirmed that *Iwamura's* goal was to treat an object with electrically neutral "activated species," while minimizing damage to the object caused by ions that are generated along with the activated species. This is relevant to Patent Owner's argument that the purpose of *Iwamura's* two-stage system is NOT to super-ionize an initial plasma,<sup>13</sup> and that *Iwamura's* teaching is in fact contrary to this objective of the invention. First, Dr. Kortshagen explained that the "activated species" described by *Iwamura* are electrically neutral atoms/molecules that are in an excited energy state.<sup>14</sup>

Q. Do you have an understanding of what Iwamura means by the term "activated gas species"?

THE WITNESS: I believe what Iwamura refers to with "activated gas species" is can include excited atoms, excited molecules, potentially fragmented molecules, which would be called radicals.

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<sup>12</sup> *Ex. 2004* at 63:6 – 72:6; 76:6-16; 78:3 – 79:14.

<sup>13</sup> Patent Owner's Opposition at 27.

<sup>14</sup> *Id.* at 60:4-16.

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