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Paper 12
Entered: September 3, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-00456
Patent 7,808,184 B2

Before KEVIN F. TURNER, DEBRA K. STEPHENS, JONI Y. CHANG, SUSAN L.C. MITCHELL, and JENNIFER M. MEYER,
Administrative Patent Judges.

MITCHELL, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Intel Corporation ("Intel") filed a Revised Petition requesting *inter partes* review of claims 6–10 and 16–20 of U.S. Patent No. 7,808,184 B2 ("the '184 patent"). Paper 4 ("Pet."). Zond, LLC ("Zond") filed a Preliminary Response. Paper 11 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides:

> THRESHOLD.—The Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.

Upon consideration of Intel's Petition and Zond's Preliminary Response, we conclude that the information presented in the Petition demonstrates that there is a reasonable likelihood that Intel would prevail in challenging claims 6–10 and 16–20 ("the challenged claims") as unpatentable under 35 U.S.C. § 103(a). Pursuant to 35 U.S.C. § 314, we hereby authorize an *inter partes* review to be instituted as to claims 6–10 and 16–20 of the '184 patent based on the specific grounds discussed below.

A. Related Matters

Intel indicates that the '184 patent was asserted in *Zond, LLC v. Intel Corp.*, No.1:13-cv-11570-RGS (D. Mass.). Pet. 1. Intel also identifies other cases where Zond asserted the claims of the '184 patent against third parties,

as well as other Petitions for *inter partes* review that are related to this proceeding. *Id*.

B. The '184 patent

The '184 patent relates to methods for generating strongly-ionized plasmas in a plasma generator. Ex. 1101, Abs. When creating a plasma in a chamber, a direct current ("DC") electrical discharge, which is generated between two electrodes with a feed gas, generates electrons in the feed gas that ionize atoms to create the plasma. *Id.* at 1:16–20. For an application, such as magnetron plasma sputtering, a relatively high level of energy must be supplied, which may result in overheating the electrodes or the work piece. *Id.* at 1:21–26. Such overheating may be addressed by complex cooling mechanisms, but such cooling can cause temperature gradients in the chamber causing a non-uniform plasma process. *Id.* at 1:26–30. These temperature gradients may be reduced by pulsing the DC power, but high-power pulses may result in arcing at plasma ignition and termination. *Id.* at 1:31–36. Arcing is problematic because it can cause the release of undesirable particles in the chamber thereby contaminating the work piece. *Id.* at 1:36–37, 4:8–11.

According to the '184 patent, a pulsed power supply may include circuitry that minimizes or eliminates the probability of arcing in the chamber by limiting the plasma discharge current to a certain level and dropping the generated voltage for a certain period of time if the limit is exceeded. *Id.* at 4:6–15. Figure 2, reproduced below, shows measured data of discharge voltage as a function of discharge current for admitted prior-art,

low-current plasma 152, and high-current plasma 154 created by the claimed methods using the pulsed power supply. *Id.* at 1:58–60.

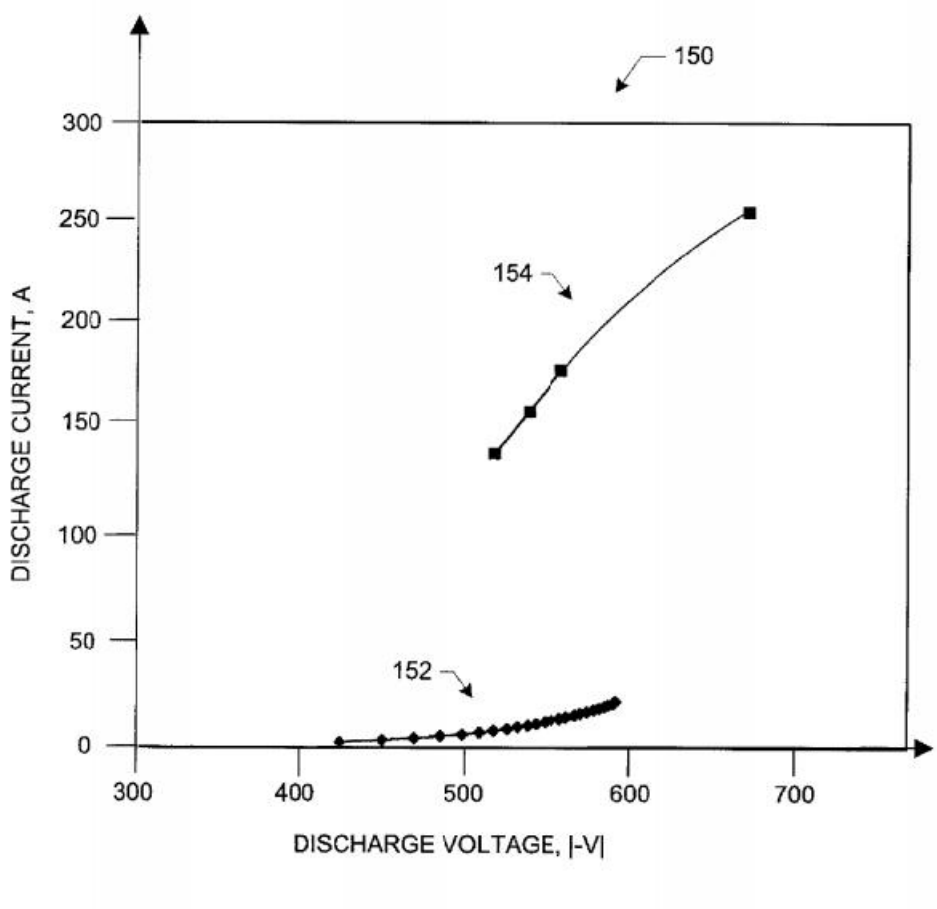

FIG. 2

Figure 2 shows current-voltage characteristic 154 that represents actual data for plasma generated by the pulsed power supply in the plasma sputtering system depicted in Figure 1 (not reproduced here). *Id.* at 5:28–30. The current-voltage characteristic 154 is in a high-current regime that generates a relatively high plasma density (greater than 10^{12}–10^{13} cm^{-3}). *Id.* at 5:40–43. The pulsed power supply generates waveforms that create and sustain the high-density plasma with current-voltage characteristics in the high-current regime. *Id.* at 5:55–59. The '184 patent explicitly defines the

term "high-current regime" as "the range of plasma discharge currents that are greater than about 0.5 A/cm^2 for typical sputtering voltages of between about -300V to -1000V. The power density is greater than about 250 W/cm^2 for plasmas in the high-current regime." *Id.* at 5:43–48.

The '184 patent also describes a multi-stage ionization process wherein a multi-stage voltage pulse that is generated by the pulsed power supply creates a strongly-ionized plasma. *See id.* at 2:1–3; 7:4–7 (describing Figure 4 (not reproduced here) as such an example); *id.* at 14:50–15:46 (describing Figure 5C (not reproduced here) as an illustrative multi-stage voltage pulse). Such a multi-stage voltage pulse initially generates a weakly-ionized plasma in a low-current regime (shown as 152 in Figure 2 above), and then eventually generates a strongly-ionized or high-density plasma in a high-current regime. *Id.* at 7:10–13. "Weakly-ionized plasmas are generally plasmas having plasma densities that are less than about 10^{12}–10^{13} cm^{-3} and strongly-ionized plasmas are generally plasmas having plasma densities that are greater than about 10^{12}–10^{13} cm^{-3}." *Id.* at 7:14–18.

C. Illustrative Claim

All of the challenged claims are dependent on either independent claim 1 or 11. Challenged claims 6 through 10 depend from claim 1, and challenged claims 16 through 20 depend from claim 11. Claim 1, reproduced below, is illustrative:

> 1. A method of generating a strongly-ionized plasma, the method comprising:
>
> a) supplying feed gas proximate to an anode and a cathode assembly; and

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