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Paper 9
Entered: October 14, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GLOBALFOUNDRIES U.S., INC., GLOBAL FOUNDRIES DRESDEN MODULE ONE LLC & CO. KG, and GLOBALFOUNDRIES DRESDEN MODULE TWO LLC & CO. KG,
Petitioner,

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-01100
Patent 7,604,716 B2

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

MEYER, *Administrative Patent Judge*.

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

I. INTRODUCTION

GLOBALFOUNDRIES U.S., Inc., GLOBAL FOUNDRIES Dresden Module One LLC & Co. KG, and GLOBALFOUNDRIES Dresden Module Two LLC & Co. KG, (collectively, "Petitioner") filed a Petition requesting *inter partes* review of claims 12 and 13 ("the challenged claims") of U.S. Patent No. 7,604,716 B2 (Ex. 1101, "the '716 patent"). Paper 2 ("Pet."). Zond, LLC ("Patent Owner") timely filed a Preliminary Response. Paper 7 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a).

Upon consideration of the information presented in the Petition and the Preliminary Response, we determine that there is a reasonable likelihood that Petitioner would prevail in challenging claims 12 and 13. Accordingly, pursuant to 35 U.S.C. § 314, we authorize an *inter partes* review to be instituted as to the challenged claims.

A. Related Matters

Petitioner indicates that the '716 patent was asserted in several related district court cases, including *Zond, LLC v. Advanced Micro Devices, Inc.*, No. 1:13-cv-11577-DPW (D. Mass.). Pet. 1 (citing Ex. 1118). Petitioner also identifies other petitions for *inter partes* review that are related to this proceeding. *Id.*

B. The '716 Patent

The '716 patent relates to a method and apparatus for generating a strongly-ionized plasma, for use in various plasma processes. Ex. 1101, Abstract, 7:30–47. For example, at the time of the invention, plasma sputtering was a widely used technique for depositing films on substrates. *Id.* at 1:24–25. As discussed in the '716 patent, prior art magnetron sputtering systems deposited films having low uniformity and poor target utilization (the target material erodes in a non-uniform manner). *Id.* at 3:20–33. The '716 patent discloses that increasing the power applied to the plasma, in an attempt to increase the plasma uniformity and density, can also "increase the probability of generating an electrical breakdown condition leading to an undesirable electrical discharge (an electrical arc) in the chamber." *Id.* at 3:34–40.

The '716 patent further discloses that using pulsed DC power can reduce the probability of establishing such an electrical breakdown condition, but that large power pulses still can result in undesirable electrical discharges. *Id.* at 3:42–52. According to the '716 patent, however, first forming a weakly-ionized plasma "substantially eliminates the probability of establishing a breakdown condition in the chamber when high-power pulses are applied between the cathode . . . and the anode." *Id.* at 6:16–19. The "probability of establishing a breakdown condition is substantially eliminated because the weakly-ionized plasma . . . has a low-level of ionization that provides electrical conductivity through the plasma. This conductivity substantially prevents the setup of a breakdown condition, even

when high power is applied to the plasma." *Id.* at 6:20–25. Once the weakly-ionized plasma is formed, high-power pulses are applied between the cathode and anode to generate a strongly-ionized plasma from the weakly-ionized plasma "without developing an electrical breakdown condition in the chamber." *Id.* at 6:52–54, 7:16–19, 20:26–27. The '716 patent also describes providing a flow of feed gas sufficient to cause a rapid volume exchange of the strongly-ionized plasma, which permits application of a high power pulse with a longer duration, resulting in formation of a higher density plasma. *Id.* at 4:56–67, 20:61–67.

C. Challenged Claims

Each of challenged claims 12 and 13 depends, directly or indirectly, from claim 1. Claims 1, 12, and 13 are reproduced as follows:

> 1. An apparatus for generating a strongly-ionized plasma, the apparatus comprising:
>
> a. an ionization source that generates a weakly-ionized plasma from a feed gas contained in a chamber, the weakly-ionized plasma substantially eliminating the probability of developing an electrical breakdown condition in the chamber; and
>
> b. a power supply that supplies power to the weakly-ionized plasma th[r]ough an electrical pulse that is applied across the weakly-ionized plasma, the electrical pulse having at least one of a magnitude and a rise-time that is sufficient to transform the weakly-ionized plasma to a strongly-ionized plasma without developing an electrical breakdown condition in the chamber.

Ex. 1101, 20:14–27.

> 12. The apparatus of claim 1 further comprising a gas line that is coupled to the chamber, the gas line supplying feed gas to the strongly-ionized plasma that transports the strongly-ionized plasma by a rapid volume exchange.

Id. at 20:61–64.

> 13. The apparatus of claim 12 wherein the gas volume exchange permits additional power to be absorbed by the strongly-ionized plasma.

Id. at 20:65–67.

D. Prior Art Relied Upon

Petitioner relies upon the following prior art references (Pet. 2–3):

Wang	US 6,413,382 B1	July 2, 2002	(Ex. 1104)
Lantsman	US 6,190,512 B1	Feb. 20, 2001	(Ex. 1105)

D.V. Mozgrin, et al., *High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research*, 21 PLASMA PHYSICS REPORTS 400–409 (1995) (Ex. 1103) ("Mozgrin")

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 3, 14–44):

Claims	Basis	References
12, 13	§ 103	Mozgrin and Lantsman
12, 13	§ 103	Wang and Lantsman

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