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Paper 9
Entered: October 14, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.
and TSMC NORTH AMERICA CORP.,
Petitioner,

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-00808
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

Taiwan Semiconductor Manufacturing Company, Ltd. and TSMC North America Corp. (collectively, "Petitioner") filed a Petition requesting *inter partes* review of claims 19–24 ("the challenged claims") of U.S. Patent No. 7,604,716 B2 (Ex. 1301, "the '716 patent"). Paper 1 ("Pet."). Zond, LLC ("Patent Owner") timely filed a Preliminary Response. Paper 8 ("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 19–24. 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. Fujitsu*, No. 1:13-cv-11634-WGY (D. Mass.). Pet. 1. 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. 1301, 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. Illustrative Claims

Challenged claims 19–24 each depend from claim 14, which is not challenged in the present Petition. Claims 14 and 19 are illustrative, and are reproduced as follows:

> 14. A method for generating a strongly -ionized plasma, the method comprising:
>
> a. ionizing a feed gas in a chamber to form a weakly-ionized plasma that substantially eliminates the probability of developing an electrical breakdown condition in the chamber; and
>
> b. supplying an electrical pulse across the weakly-ionized plasma that excites atoms in the weakly-ionized plasma, thereby generating a strongly-ionized plasma without developing an electrical breakdown condition in the chamber.

Ex. 1301, 21:1–11.

> 19. The method of claim 14 further comprising supplying feed gas to the strongly-ionized plasma to transport the strongly-ionized plasma by a rapid volume exchange.

Id. at 21:29–31.

D. Prior Art Relied Upon

Petitioner relies upon the following prior art references (Pet. 3–4):

Wang	US 6,413,382 B1	July 2, 2002	(Ex. 1304)
Lantsman	US 6,190,512 B1	Feb. 20, 2001	(Ex. 1306)

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. 1303) ("Mozgrin").

A.A. Kudryavtsev and V.N. Skerbov, *Ionization Relaxation in a Plasma Produced by a Pulsed Inert-Gas Discharge*, 28 SOV. PHYS. TECH. PHYS. 30–35 (Jan. 1983) (Ex. 1305) ("Kudryavtsev").

D.V. Mozgrin, *High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research*, Thesis at Moscow Engineering Physics Institute (1994) (Ex. 1307) ("Mozgrin Thesis").[1]

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 4, 15–56):

Claims	Basis	References
22–24	§ 103	Mozgrin and Kudryavtsev
19, 20	§ 103	Mozgrin, Kudryavtsev, and Lantsman
21	§ 103	Mozgrin, Kudryavtsev, and Mozgrin Thesis

[1] The Mozgrin Thesis is a Russian-language reference. Petitioner has also submitted a certified English-language translation (Ex. 1308).

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