

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

ZOND, LLC,  
Patent Owner.

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Case IPR2014-00807  
Patent 7,604,716 B2

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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 14–18 and 25–32 (“the challenged claims”) of U.S. Patent No. 7,604,716 B2 (Ex. 1201, “the ’716 patent”). Paper 1 (“Pet.”). Zond, LLC (“Patent Owner”) timely filed a Preliminary Response. Paper 9<sup>1</sup> (“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 14–18 and 25–32. 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 in *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.*

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<sup>1</sup> Patent Owner filed two copies of the Preliminary Response, which appear to be identical. *See* Papers 8, 9. We refer to the copy filed as Paper 9 throughout the Decision.

*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. 1201, 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.

### *C. Illustrative Claims*

Of the challenged claims, claims 14 and 26 are independent. Claims 15–18 and 25 depend from claim 14. Claims 27–32 depend from claim 26. Claims 14 and 16 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. 1201, 21:1–11.

26. An apparatus for generating a strongly-ionized plasma, the apparatus comprising:

a. an anode;

b. a cathode that is positioned adjacent to the anode;

c. an ionization source that generates a weakly-ionized plasma proximate to the cathode, the weakly-ionized plasma substantially eliminating the probability of developing an

electrical breakdown condition between the anode and the cathode; and

d. a power supply that is electrically coupled to the anode and to the cathode, the power supply generating an electric field that excites atoms in the weakly-ionized plasma, thereby forming a strongly-ionized plasma without developing an electrical breakdown condition in the chamber.

*Id.* at 22:1–15.

#### *D. Prior Art Relied Upon*

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

Wang            US 6,413,382 B1     July 2, 2002     (Ex. 1204)

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. 1203) (“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. 1205) (“Kudryavtsev”).

#### *E. Asserted Grounds of Unpatentability*

Petitioner asserts the following grounds of unpatentability (Pet. 3–4, 14–59):

Claims	Basis	References
14–18, 25–32	§ 103	Mozgrin and Kudryavtsev
14–18, 25–32	§ 103	Wang and Kudryavtsev

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