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Paper 40
Entered: September 23, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-01099[1]
Patent 7,604,716 B2

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

CHAGNON, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

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[1] Case IPR2014-00972 has been joined with the instant proceeding.

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–11 and 33 of U.S. Patent No. 7,604,716 B2 (Ex. 1001, "the '716 patent") are unpatentable.

A. Procedural History

GLOBALFOUNDRIES U.S., Inc., GLOBALFOUNDRIES Dresden Module One LLC & Co. KG, and GLOBALFOUNDRIES Dresden Module Two LLC & Co. KG (collectively, "GlobalFoundries") filed a Petition (Paper 2, "Pet.") seeking *inter partes* review of claims 1–11 and 33 ("the challenged claims") of the '716 patent. GlobalFoundries included a Declaration of Uwe Kortshagen, Ph.D. (Ex. 1002) to support its positions. Zond ("Patent Owner") filed a Preliminary Response (Paper 7, "Prelim. Resp."). Pursuant to 35 U.S.C. § 314, on October 14, 2014, we instituted an *inter partes* review of the challenged claims to determine if the claims are unpatentable under 35 U.S.C. § 102 as anticipated by Wang.[2] Paper 9 ("Inst. Dec.").

Subsequent to institution, we granted a revised Motion for Joinder filed by The Gillette Company ("Gillette"), joining Case IPR2014-00972

[2] U.S. Patent No. 6,413,382 B1, issued July 2, 2002 (Ex. 1004, "Wang").

with the instant trial (Paper 12).[3] Patent Owner filed a Patent Owner Response (Paper 24, "PO Resp."), along with a Declaration of Larry D. Hartsough, Ph.D. (Ex. 2004) to support its positions. Petitioner filed a Reply (Paper 30, "Reply") to the Patent Owner Response, along with a supplemental Declaration of Dr. Kortshagen (Ex. 1025). An oral hearing[4] was held on June 12, 2015. A transcript of the hearing is included in the record. Paper 39.

B. Related Proceedings

The parties indicate that the '716 patent was asserted against Petitioner, as well as other defendants, in seven district court lawsuits pending in the District of Massachusetts. Pet. 1; Paper 5; Ex. 1023.

C. 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. 1001, 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–

[3] We refer to GlobalFoundries and Gillette, collectively, as "Petitioner" throughout this Decision.
[4] The oral hearings for IPR2014-00807, IPR2014-00808, IPR2014-00818, IPR2014-00819, IPR2014-00821, IPR2014-00827, IPR2014-01098, IPR2014-01099, and IPR2014-01100 were consolidated.

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.

D. Illustrative Claims

Of the challenged claims, claims 1 and 33 are independent. Claims 2–11 depend from claim 1. Claims 1 and 33 are illustrative, and 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. 1001, 20:14–27.

> 33. An apparatus for generating a strongly-ionized plasma, the apparatus comprising:
>
> a. means for 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. means for supplying an electrical pulse across the weakly-ionized plasma to transform the weakly-ionized plasma to a strongly-ionized plasma without developing an electrical breakdown condition in the chamber.

Id. at 22:41–50.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–79 (Fed. Cir. 2015). Claim terms generally are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire

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