

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC.,
Petitioner,

v.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,
Patent Owner.

Case IPR2017-00662
Patent 6,969,539 B2

Before CHRISTOPHER L. CRUMBLEY, JON B. TORNQUIST, and
CHRISTOPHER M. KAISER, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

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

INTRODUCTION

A. Background

Micron Technology, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 24, 26, and 29 of U.S. Patent No. 6,969,539 B2 (Ex. 1001, “the ’539 patent”). The President and Fellows of Harvard College (“Patent Owner”) filed a Preliminary Response (Paper 8, “Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b); 37 C.F.R. § 42.4(a). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), 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.”

After considering the Petition, the Preliminary Response, and the evidence currently of record, we determine that Petitioner has demonstrated that there is a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, we institute *inter partes* review.

B. Related Matters

The parties note that the ’539 patent is at issue in *President and Fellows of Harvard College v. Micron Technology, Inc.*, No. MAD-1-16-cv-11249 (D. Mass.), and in *President and Fellows of Harvard College v. GlobalFoundries, Inc.*, No. MAD-1-16-cv-11252 (D. Mass.). Pet. 2; Paper 3, 2. United States Patent No. 8,334,016 B2, which is related to the ’539 patent, is being challenged in three *inter partes* review petitions, which have

IPR2017-00662
Patent 6,969,539 B2

been assigned case numbers IPR2017-00663, IPR2017-00664, and IPR2017-00666.

C. The Asserted Grounds of Unpatentability

Petitioner contends that claims 24, 26, and 29 of the '539 patent are unpatentable based on the following grounds (Pet. 29–63):¹

Statutory Ground	Basis	Challenged Claim(s)
§ 102	Buchanan ²	24, 26, and 29
§ 103	Buchanan	24, 26, and 29
§ 103	Vaartstra ³ and Min ⁴	24, 26, and 29

D. The '539 Patent

The '539 patent, titled “Vapor Deposition of Metal Oxides, Silicates and Phosphates, and Silicon Dioxide,” issued on November 29, 2005. Ex. 1001, at [45], [54]. The '539 patent “relates to novel reagents for use in thin film deposition processes such as chemical vapor deposition (CVD) and atomic layer deposition (ALD).” *Id.* at 1:22–24. The '539 patent explains that prior deposition processes “deposit[ed] films containing residual chlorine, which can be deleterious to the properties of the film or to its adhesion to substrates or subsequent coatings” and can “corrode metal

¹ Petitioner also relies on a declaration from Sanjay Banerjee, Ph.D. Ex. 1003.

² Buchanan et al., U.S. Patent No. 6,984,591 B1, issued Jan. 10, 2006 (Ex. 1005, “Buchanan”).

³ Vaartstra, U.S. Patent No. 6,159,855, issued Dec. 12, 2000 (Ex. 1006, “Vaartstra”).

⁴ Jae-Sik Min, Young-Woong Son, Won-Gu Kang, Soung-Soon Chun, & Sang-Won Kang, *Atomic Layer Deposition of TiN Films by Alternate Supply of Tetrakis(ethylmethylamino)-Titanium and Ammonia*, 37 JAPANESE J. APPLIED PHYSICS 4999, 4999–5004 (Sept. 1998) (Ex. 1007, “Min”).

substrates or the apparatus used for the deposition.” *Id.* at 1:59–64. It is the aim of the ’539 patent to solve these problems. *Id.* at 1:64–65, 2:8–14. The ’539 patent describes depositing layers of metal oxides, such as hafnium oxide, zirconium oxide, and tantalum oxide, by atomic layer deposition. *Id.* at 26:65–28:16. The deposition process for hafnium oxide is described as alternately injecting vapors of tetrakis(dimethylamido)hafnium and water “into a deposition chamber held at 250° C.” *Id.* at 26:65–27:3. The ’539 patent also describes producing a hafnium oxide film using “tert-butanol vapor in place of water vapor.” *Id.* at 28:1–7. The deposition of zirconium oxide and tantalum oxide films using tetrakis(dimethylamido)zirconium and ethylimidotris(diethylamido)tantalum vapors in place of tetrakis(dimethylamido)hafnium vapor, respectively, are also described. *Id.* at 27:63–67, 28:10–16.

E. Illustrative Claim

Claims 24, 26, and 29 of the ’539 patent are challenged. Claim 24 is independent and illustrative; it recites:

24. A process for forming a metal oxide, comprising:
exposing a heated surface alternately to the vapor of one or more metal amides having an amido group selected from the group consisting of dialkylamido, disilylamido and (alkyl)(silyl) amido moieties, and then to the vapors of water or an alcohol.

Ex. 1001, 32:17–22.

ANALYSIS

A. Claim Construction

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see*

Cuozzo Speed Techs. LLC v. Lee, 136 S. Ct. 2131, 2144 (2016) (upholding the use of the broadest reasonable interpretation standard). 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 disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Neither party proposes construing any terms. Pet. 20–21; Prelim. Resp. 15–16. For the purposes of this decision, we determine that no term requires express construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”).

B. Asserted Anticipation by Buchanan

Petitioner argues that Buchanan anticipates claims 24, 26, and 29. Pet. 43–51.

1. Buchanan

Buchanan relates to “[a] precursor source mixture useful for CVD or ALD of a film.” Ex. 1005, at [57]. In the manufacture of semiconductors, Buchanan teaches that it is important to be able to deposit uniformly thick layers of oxides. *Id.* at 1:15–27. Buchanan notes that the chemical precursors used in conventional CVD and ALD processes to deposit films of uniform thickness suffer from drawbacks, including the difficulty in maintaining constant temperature and thermal degradation of the precursors. *Id.* at 1:28–54. To solve these problems, Buchanan discloses a “precursor source mixture” comprising “at least one precursor composed of an element selected from the group consisting of Li, Na, K, Rb, Cs, Fr, Be, Mg, Ti, Zr,

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.