

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 IPR2017-01493
Patent 6,969,539 B2

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

KAISER, *Administrative Patent Judge*.

DECISION
Denying 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 an *inter partes* review of claim 31 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 9, “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 not demonstrated that there is a reasonable likelihood that it would prevail with respect to the claim challenged in the Petition. Accordingly, we do not institute an *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. 3; Paper 4, 1. The ’539 patent also is being challenged in a separate *inter partes* review, which has been assigned case number IPR2017-00662. In addition, United States Patent No. 8,334,016 B2, which is related to the ’539 patent, is

being challenged in two currently pending *inter partes* review petitions, which have been assigned case numbers IPR2017-00663 and IPR2017-00664.

C. The Asserted Grounds of Unpatentability

Petitioner contends that claim 31 of the '539 patent is unpatentable based on the following grounds (Pet. 38–67):¹

Statutory Ground	Basis	Challenged Claim
§ 103	Dücsö ² and Buchanan ³	31
§ 103	Ott ⁴ and Vaartstra ⁵	31

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

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

² Csaba Dücsö, Nguyen Quoc Khanh, Zsolt Horváth, István Bársony, Mikko Utriainen, Sari Lehto, Minna Nieminen, & Lauri Niinistö, *Deposition of Tin Oxide into Porous Silicon by Atomic Layer Epitaxy*, 143 J. ELECTROCHEMICAL SOC'Y 683–87 (Feb. 1996) (Ex. 1006, “Dücsö”).

³ Buchanan et al., U.S. Patent No. 6,984,591 B1, issued Jan. 10, 2006 (Ex. 1005, “Buchanan”).

⁴ A.W. Ott, J.W. Klaus, J.M. Johnson, S.M. George, K.C. McCarley, & J.D. Way, *Modification of Porous Alumina Membranes Using Al₂O₃ Atomic Layer Controlled Deposition*, 9 Chem. Materials 707–14 (Ex. 1007, “Ott”).

⁵ Vaartstra, U.S. Patent No. 6,159,855, issued Dec. 12, 2000 (Ex. 1008, “Vaartstra”).

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 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. The ’539 patent discloses that “the use of tetrakis(alkylamido) hafnium precursors succeeded” in depositing “highly uniform films of hafnium oxide even in holes with very high aspect [ratios] (over 40).” *Id.* at 20:4–7.

E. Illustrative Claim

Claim 31 of the ’539 patent is the only claim challenged in the Petition; it recites:

31. A process as in any one of claims 24, 26, 29 or 30, in which the metal oxide film covers an aspect ratio over 40.

Ex. 1001, 32:39–40. Claim 31 is a multiple dependent claim that depends from any of claims 24, 26, 29, or 30; claim 24 is illustrative of this group and 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.

Id. at 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 claim terms, and we conclude that no term requires express construction for the purpose of the present decision. *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. Obviousness over *Dücsö* and *Buchanan*

Petitioner argues that the subject matter of claim 31 would have been obvious to a person of ordinary skill in the art given the teachings of *Dücsö* and *Buchanan*. Pet. 38–53.

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