UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC., INTEL CORPORATION,
AND GLOBALFOUNDRIES U.S., INC.
Petitioners

v.

DANIEL L. FLAMM,

Patent Owner

U.S. Patent No. 5,711,849

Issued: January 27, 1998

Named Inventor: Daniel L. Flamm

Title: PROCESS OPTIMIZATION IN
GAS PHASE DRY ETCHING

DECLARATION OF DR. DAVID B. GRAVES IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 5,711,849

Mail Stop: PATENT BOARD
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U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

I, David B. Graves, declare as follows:

I. INTRODUCTION

1. I am over 18 years of age and otherwise competent to make this Declaration.

2. I have been asked to provide my views regarding technical issues in connection with the above-captioned *inter partes* review of U.S. Patent No. 5,711,849 ("the 849 Patent"). I have also have been asked to provide my opinion on whether claims 1-29 of the 849 Patent are valid in light of the prior art in Grounds 1 and 2 and the knowledge of one of ordinary skill in the art at the time of the alleged invention. It is my opinion that claims 1-29 are invalid for the reasons set forth in this declaration.

II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

3. I am currently a Professor of Chemical and Biomolecular Engineering at the University of California, Berkeley. I was the Lam Research Distinguished Professor in Semiconductor Processing 2011-16. I have been a full professor since 1997. I was an Associate Professor from 1997-1997, and an Assistant Professor from 1986-1991. My prior employment also includes being a computer process control engineer for Standard Oil of California from 1978-1981. I have also provided research support for a number of major semiconductor manufacturing and processing companies.

4. I obtained my Ph.D. in Chemical Engineering from the University of Minnesota in 1986. I also received my Master's degree in Chemical Engineering from the University of Arizona in 1981, and my Bachelor's degree in Chemical Engineering from the University of Arizona in 1978.

5. I have significant research experience in many issues relating to semiconductor devices and their processing, including thin film etching and deposition in semiconductor manufacturing, plasma chemistry and plasma processing for semiconductors, modeling and simulation of low temperature nonequilibrium plasmas, plasma-surface interactions and plasma-surface chemistry, nanofeature profile evolution simulation, molecular dynamics of plasma-surface interactions, particles and photons in plasmas, optical and mass spectroscopy in low temperature plasmas, and microplasmas. I have published over two hundred peer-reviewed papers and given many presentations on these topics.

6. I have taught courses in solid state device processing, process control, transport processes, and mathematical methods at the undergraduate and graduate level. I have supervised the research of approximately 50 students and scholars in the area of semiconductor plasma processing and manufacturing as part of their work for their PhDs as well as post-doctoral work.

7. My *curriculum vitae* (CV) (Ex.1004) includes additional details

about my experience and professional background.

8. I am being compensated for my time at my standard hourly rate of $400 in connection with this proceeding. My compensation is in no way contingent upon my performance or the outcome of this case.

9. I have been asked my technical opinions regarding the understanding of a person of ordinary skill in the art (discussed below) as it relates to the 849 Patent and other reference documents. I have also been asked to provide my technical opinions on concepts discussed in the 849 Patent and other reference documents, as well as my technical opinions on how these concepts relate to several claim limitations of the 849 Patent in the context of the specification. Finally, I have been asked to provide my opinion regarding whether claims 1-29 of the 849 Patent are invalid in light of the prior art in Ground 1, viewing that art from the perspective of one of ordinary skill in the art.

10. In reaching the opinions stated herein, I have considered the 849 Patent, its prosecution history, and the Exhibits to the Petition. I have also drawn, as appropriate upon my own education, training, research, knowledge, and personal and professional experience.

III. RELEVANT LEGAL STANDARDS

11. My opinions are informed by my understanding of the relevant law. I understand that the patentability analysis is conducted on a claim-by-claim basis.

12. I understand that the 849 Patent has expired. Accordingly, in my analysis, all claim terms have been accorded their plain and ordinary meaning, as understood by a person having ordinary skill in the art and consistent with the specification and file history of the 849 Patent.

13. I understand that a single piece of prior art "anticipates" a claim if each and every element of the claim is disclosed in that prior art. I further understand that, where a claim element is not explicitly disclosed in a prior art reference, the reference may nonetheless anticipate a claim if the missing claim element is necessarily present in the apparatus or a natural result of the method disclosed—i.e., if the missing element is "inherent."

14. I understand that the prior art may render a patent claim "obvious." I understand that two or more pieces of prior art that each disclose fewer than all elements of a patent claim may nevertheless be combined to render a patent claim obvious if the combination of the prior art collectively discloses all elements of the claim and a person having ordinary skill in the art at the time would have had reason to combine the prior art. I understand that this reason to combine need not be explicit in any of the prior art, but may be inferred from the knowledge of a person having ordinary skill in the art at the time the patent application was filed. I also understand that a person having ordinary skill in the art is not an automaton, but is a person having ordinary creativity. I further understand that one or more

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