IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

ENERGETIQ TECHNOLOGY, INC., Plaintiff, v. ASML NETHERLANDS B.V., EXCELITAS TECHNOLOGIES CORP., and QIOPTIQ PHOTONICS GMBH & CO. KG, Defendants.	Civil Action No. 1:15-cv-10240-LTS **PUBLIC VERSION**

SECOND DECLARATION OF DONALD K. SMITH, PH.D.
IN SUPPORT OF ENERGETIQ'S REPLY BRIEF
IN SUPPORT OF ITS MOTION FOR PRELIMINARY INJUNCTION

I. INTRODUCTION

1. I, Donald K. Smith, Ph.D., am President of Energetiq Technology, Inc. ("Energetiq"), which has its principal place of business at 7 Constitution Way, Woburn, MA 01801. I have worked at Energetiq Technology, Inc. in this capacity since 2004.

2. I submit this declaration ("Second Smith Declaration") in support of Energetiq's Reply to Defendants' Opposition to Energetiq's Motion for Preliminary Injunction.

3. I have personal knowledge of the facts set forth in this declaration, unless otherwise noted. If called upon as a witness, I could and would competently testify to the statements made herein.

II. QUALIFICATIONS

4. My qualifications are described in the Smith Declaration dated February 6, 2015 ("First Smith Decl.") at ¶¶ 4-5. I incorporate these paragraphs herein by reference, together with my *curriculum vitae*, which was attached to the First Smith Decl. as Exhibit E.

III. MATERIALS REVIEWED

5. In preparing this declaration, I reviewed and considered the Cantin Declaration (Doc. No. 46) and all of its attached exhibits that were made publicly available. In addition, I reviewed paragraphs 15-52 and 54-83 of the Ross Declaration (Exhibit 10 to the Cantin Declaration), which I understand that Defendants' counsel has permitted me to review, having filed the Ross Declaration under seal.

6. I received paragraphs 15-52 and 54-83 of the Ross Declaration, which contain excerpts from Dr. Ross's invalidity contentions, on the afternoon on Friday, March 13, 2015. At this point, I have had less than three business days to review these documents. Therefore, I reserve my right to supplement this paper and any testimony that I may provide to the Court with further statements that may become necessary.

IV. FACTUAL BACKGROUND

7. Energetiq is not currently supported by government or industry research grants. Energetiq is supported by profit on sales of patented products and does not have any current government or industry research grants. Any government research grants that Energetiq once had are no longer in effect. Energetiq projects some limited revenue from non-recurring engineering (NRE) services. These NRE services are generally to make measurements and/or to customize Energetiq's products for particular customers' special requirements. This sort of activity is product-related, even though any engineering activity can be termed "R&D."

V. VALIDITY OF ENERGETIQ'S PATENTS

A. **Overview of Validity and Response to Dr. Ross's Contentions**

8. The inventions covered by the patents-in-suit satisfied a long-felt need for a product that would enable inspection and metrology of semiconductor wafers to achieve higher throughput (e.g., more wafers per hour), better sensitivity (e.g., the ability to detect small features) and resolution (e.g., the ability to see and measure small features). These inventions have received considerable praise and multiple industry awards, as evidenced by multiple documents cited previously (see, e.g., First Smith Decl. ¶ 11, Exhibits K and L). These awards and praise letters were directly related to the merits of the inventions.

9. The inventions were rapidly adopted in the industry. [redacted]

10. In addition, the inventions overcame significant industry skepticism. In particular, expert industry scientists were surprised and skeptical that a laser in the near-infrared range could be used to sustain small intense plasmas providing a light source much brighter than the commonly used arc lamps. These scientists accepted the extremely surprising performance of the invention only after demonstration of the high brightness of the light source shown in the Energetiq patents.

11. I believe that this skepticism was based in part on teachings such as those described in certain references cited by Dr. Ross, including Cremers and Keefer. For example,

these references state that laser power would be absorbed in a laser sustained plasma only by a process called "inverse brehmsstrahlung." The "inverse brehmsstrahlung" theory taught that the use of shorter wavelength lasers, such as those disclosed in the Energetiq patents, would result in even larger, less bright plasmas. Indeed, Cremers and Keefer describe work that had produced large plasmas that were not useful as high brightness light sources when plasmas were sustained using CO_2 lasers having wavelengths of about 10 microns. However, as explained in the '982 patent, Energetiq's technology overcame this problem and surprised the patterned wafer inspection and metrology industry. This surprise was a reason for the inventions' receiving considerable praise and the industry's wide adoption of the technology. The wide adoption was by parties including by [redacted]

12. I believe that the Defendants, after buying Energetiq products embodying the invention, began to copy the Energetiq products and use the copies to replace arc lamps in the ASML Yieldstar semiconductor metrology product. Notably, the Defendants had not used laser driven light sources based on some prior art, but had only used arc lamps until the Energetiq product was available to be copied.

B. Validity of the '982 Patent

13. Dr. Ross alleges that "multiple references that are prior art to the '982 patent by more than a decade disclose each and every feature of asserted '982 patent claim 10." Ross Decl. at ¶ 16. Dr. Ross alleges that such references include Gärtner, Cremers, and Keefer.

14. I disagree with each of Dr. Ross's contentions, at least because each of Gärtner, Cremers, or Keefer fails to disclose a "high brightness" light. Additionally, Dr. Ross's proposed combinations of references suffer from the further problems that I explain below.

15. To begin, I consider the plain language of claim 10, which is dependent on independent claim 1. Thus, the limitations of claim 10 are recited by the combination of claims 1 and 10, as follows:

> Claim 1. A light source, comprising:
> a chamber;
> an ignition source for ionizing a gas within the chamber; and
> at least one laser for providing energy to the ionized gas within the chamber to produce a high brightness light.
>
> Claim 10. The light source of claim 1 wherein the chamber is a sealed chamber.

1. Gärtner

16. Gärtner does not contain each and every element of claim 10 of the '982 patent at least because Gärtner fails to disclose a "high brightness" light, as is recited by claim 10. In addition, Dr. Ross neglects further considerations regarding Gärtner that I highlight below.

a. "High Brightness" Light

17. In the case of the term "high brightness," I believe that the '982 patent specification provides certain definition, and helpful context, which one having ordinary skill in the art at the time of the invention ("one of ordinary skill") would easily appreciate and consider in understanding what is intended by the term "high brightness" as used in claim 10 of the '982 patent. The specification states as follows:

> High brightness light sources can be used in a variety of applications. For example, a high brightness light source can be used for inspection, testing or measuring properties associated with semiconductor wafers or materials used in the fabrication of wafers (e.g., reticles and photomasks. '982 Patent, Col. 1, ll. 9-13.

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