

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLIED MATERIALS, INC.,
Petitioner,

v.

OCEAN SEMICONDUCTOR LLC,
Patent Owner.

IPR2021-01348
Patent 6,836,691 B1

Before SCOTT B. HOWARD, JOHN D. HAMANN, and
DAVID COTTA, *Administrative Patent Judges*.

HAMANN, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Applied Materials, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–19 of U.S. Patent No. 6,836,691 B1 (Ex. 1001, “the ’691 patent”) pursuant to 35 U.S.C. § 311. Ocean Semiconductor LLC (“Patent Owner”) filed a Patent Owner Preliminary Response (Paper 9, “Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 10) to the Preliminary Response relating to discretionary denial under 35 U.S.C. § 314(a), and Patent Owner filed a Preliminary Sur-Reply (Paper 11) in response to the Preliminary Reply.¹

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a) (2021). An *inter partes* review may be instituted if “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018).

Upon consideration of the papers, we determine that the information presented in the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that at least one challenged claim is unpatentable. Accordingly, we deny the Petition and do not institute *inter partes* review.

¹ We do not reach the issue of discretionary denial under § 314(a) because we determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that at least one claim of the ’691 patent is unpatentable.

A. Real Parties-in-Interest

The parties identify themselves as the real party-in-interest. Pet. 1; Paper 8, 2. Petitioner also identifies PDF Solutions, Inc. as a “potential real party-in-interest” with whom Petitioner “discussed this Petition and the Ground presented.” Pet. 1. Petitioner also identifies Analog Devices, Inc.; Huawei Device USA, Inc.; Huawei Device Co., Ltd.; HiSilicon Technologies Co., Ltd.; Infineon Technologies AG; Infineon Technologies Americas Corp.; MediaTek Inc.; MediaTek USA Inc.; NVIDIA Corporation; NXP USA, Inc.; Renesas Electronics Corporation; Renesas Electronics America, Inc.; Silicon Laboratories Inc.; STMicroelectronics, Inc.; and Western Digital Technologies, Inc. as “potential real parties-in-interest, none of whom had any access to the Petition,” according to Petitioner. *Id.* at 1–2.

B. Related Matters

The parties indicate that the '691 patent has been asserted in the following proceedings: *Ocean Semiconductor LLC v. Analog Devices, Inc.*, No. 1:20-cv-12310 (D. Mass.); *Ocean Semiconductor LLC v. Infineon Technologies AG*, No. 1:20-cv-12311 (D. Mass.); *Ocean Semiconductor LLC v. Huawei Device USA Inc.*, No. 4:20-cv-911 (E.D. Tex.); *Ocean Semiconductor LLC v. MediaTek Inc.*, No. 6:20-cv-1210 (W.D. Tex.); *Ocean Semiconductor LLC V. NVIDIA Corp.*, No. 6:20-cv-1211 (W.D. Tex.); *Ocean Semiconductor LLC v. NXP Semiconductors NV*, No. 6:20-cv-1212 (W.D. Tex.); *Ocean Semiconductor LLC v. Renesas Electronics Corp.*, No. 6:20-cv-1213 (W.D. Tex.); *Ocean Semiconductor LLC v. Silicon Laboratories Inc.*, No. 6:20-cv-1214 (W.D. Tex.); *Ocean Semiconductor LLC v. ST Microelectronics Inc.*, No. 6:20-cv-1215 (W.D. Tex.); and *Ocean Semiconductor LLC v. Western Digital Technologies, Inc.*, No. 6:20-cv-1216 (W.D. Tex.). Pet. 2; Paper 8, 2–3.

C. The Challenged Patent

The '691 patent “relates generally to an industrial process . . . in a semiconductor device manufacturing environment.” Ex. 1001, 1:8–11. In such an environment, “a set of processing steps is performed on a wafer using a variety of processing tools, including photolithography steppers, etch tools, deposition tools, polishing tools, rapid thermal processing tools, [and] implantation tools.” *Id.* at 1:27–30. “One technique for improving the operation of a semiconductor processing line includes using a factory wide control system to automatically control the operation of the various processing tools,” such as “an advanced process control (APC) system.” *Id.* at 1:31–34, 1:39–44.

In such a system, “metrology data is collected on a regular basis, generally in accordance with a sampling plan, for process control purposes.” Ex. 1001, 1:49–51. More specifically, “[t]he collected metrology data is used by the process controllers for the tools.” *Id.* at 1:51–53. For example, “[o]perating recipe parameters are calculated by the process controllers based on the performance model and the metrology information to attempt to achieve post-processing results as close to a process target value as possible.” *Id.* at 1:53–57.

According to the '691 patent, “[m]etrology data[, however,] is also used for other purposes not related to process control,” such as for fault detection and classification. Ex. 1001, 1:61–62. Thus, “when a process controller gathers metrology data to update its control model or generate a control action for subsequent processing, it retrieves . . . metrology data collected through the regular sampling plans implemented in the facility, and the metrology data collected for other purposes.” *Id.* at 2:10–17. However, “[s]ome of the metrology data does not accurately reflect the state of the

process or the devices manufactured” (e.g., “devices processed by a tool that was malfunctioning may have characteristics that were affected by the malfunction ([i.]e., a special cause) rather than by normal process variation (i.e., common cause)).” *Id.* at 2:17–23. “Employing this data for use in process control routines may introduce a source of variation that cannot be addressed by the process controller” *Id.* at 2:23–26. The invention of the ’691 patent is directed to overcoming this problem. *Id.* at 2:27–29.

To that end, the ’691 patent teaches storing “context data that includes identification data and collection purpose data,” in addition to storing the collected metrology data. Ex. 1001, 6:11–13. “Exemplary identification data includes lot identification number (ID), wafer ID, location data (e.g., location of measurement on die or wafer), [and] process-operation data (e.g., last completed step in the fabrication process).” *Id.* at 6:14–17. “The collection purpose data indicates the initial purpose for the collection of the metrology data” (e.g., for “process control sampling, fault detection sampling, [and] targeted fault detection”). *Id.* at 6:17–21. The ’691 patent teaches that the collection purpose data can comprise collection purpose codes, such as (i) “01” for “Process Control Sampling,” (ii) “02” for “Fault Detection Sampling,” (iii) “03” for “Targeted Fault Detection,” (iv) “88” for “Fault Detection - no fault identified,” and (v) “99” for “Known Defective.” *Id.* at 6:66–7:12 (including Table 1).

For embodiments of the ’691 patent, “the collection purpose data is used to filter the metrology data for subsequent uses.” Ex. 1001, 6:22–24. In particular, “a process controller . . . [, which] would conventionally employ all metrology data for a particular tool . . . for updating the states of its control model and generating a control action for modifying an operating recipe parameter for the tool,” can use the collection purpose data to filter

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