

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KOKUSAI ELECTRIC CORPORATION,¹
Petitioner,

v.

ASM IP HOLDING B.V.,
Patent Owner.

Case IPR2018-01151
Patent 7,537,662 B2

Before MICHAEL P. TIERNEY, DONNA M. PRAISS, and
CHRISTOPHER L. CRUMBLEY, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

¹ We substitute Kokusai Electric Corporation for Hitachi Kokusai Electric, Inc. as the named Petitioner in this proceeding. According to Petitioner, Hitachi Kokusai Electric, Inc. divested its thin-films process solutions business through a company split in which a new company, Kokusai Electric Corporation, will now engage in the thin-films process solutions business. Paper 6, 1. This caption should be used by the parties on all subsequent papers filed in this proceeding.

I. INTRODUCTION

A. Background

Hitachi Kokusai Electric, Inc. filed a Petition to institute an *inter partes* review of claims 1–4, 6, 9–13, 17, 18, 20, 21, and 24–28 of U.S. Patent No. 7,537,662 B2 (“the ’662 patent”). Paper 2 (“Pet.”). Subsequent to the filing of the Petition, Kokusai Electric Corporation (“Petitioner”) was identified as a new company to which the pertinent business was divested. Paper 6, 1. Thereafter, ASM IP Holding B.V. (“Patent Owner”) timely filed a Preliminary Response which does not challenge the substitution of Kokusai Electric Corporation as the petitioner in this proceeding. Paper 8 (“Prelim. Resp.”).

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). We may not institute an *inter partes* review “unless . . . 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). On April 24, 2018, the Supreme Court held that a decision to institute under 35 U.S.C. § 314(b) may not institute review on less than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355–56 (2018). Moreover, in accordance with USPTO Guidance, “if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.” See USPTO, *Guidance on the Impact of SAS on AIA Trial Proceedings* (April 26, 2018) (Available at <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>) (“USPTO Guidance”).

Applying those standards, and upon consideration of the information presented in the Petition and Preliminary Response, we determine that

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Petitioner has established a reasonable likelihood of success in proving that at least one claim of the '352 patent is unpatentable. Accordingly, we institute an *inter partes* review of all challenged claims (1–4, 6, 9–13, 17, 18, 20, 21, and 24–28) of the '662 patent, based on all grounds raised in the Petition.

B. Related Proceedings

Petitioner states that the '662 patent (along with U.S. Patent Nos. 7,018,478 and 7,833,352) is presently asserted against Petitioner in *ASM IP Holding B.V. v. Hitachi Kokusai Elec., Inc.*, Civil Action No. 3:17-cv-6879 (N.D. Cal.) filed December 1, 2017. Pet. 1; Paper 4. Petitioner is also identified as a real party in interest in two petitions (IPR2018-01357 and IPR2019-00099) challenging the patentability of related U.S. Patent Nos. 7,833,352 and 7,018,478, respectively.

Patent Owner additionally identifies as related proceedings the following two litigations asserted by Hitachi Kokusai Electric, Inc. against ASM International, N.V. involving the indicated patents (Paper 4, 1):

(1) *Hitachi Kokusai Elec., Inc. v. ASM Int'l, N.V.*, Civil Action No. 18-cv-00323 (D. Or.) (US 6,514,869, 7,622,007, 8,673,076, and 6,783,627).

(2) *Hitachi Kokusai Elec., Inc. v. ASM Int'l, N.V.*, Civil Action No. 18-cv-68880 (N.D. Cal.) (US 7,033,937, 6,576,063, 7,808,396, RE43,023, 6,744,018, 8,409,988, and 9,318,316).

C. The '662 patent

The '662 patent (Ex. 1001), titled “METHOD AND APPARATUS FOR DEPOSITING THIN FILMS ON A SURFACE,” generally relates to an apparatus for processing semiconductors, and more specifically, an

apparatus for depositing thin films on a substrate surface. Ex. 1001, 1:6–9. The apparatus features two reactant gas injectors that are separately in fluid communication with a reactant gas source and a purge gas source. *Id.* at Abstract. According to the specification, atomic layer deposition (ALD), which involves the sequential introduction of precursor species to a substrate located within a reaction chamber to form no more than a monolayer so that the process is self-terminating or saturative, may be accomplished by alternating reactant steps and intervening purge steps in a plurality of cycles. *Id.* at 1:20–26, 3:45–49.

Figure 1, an embodiment of the ALD reactor, is reproduced below:

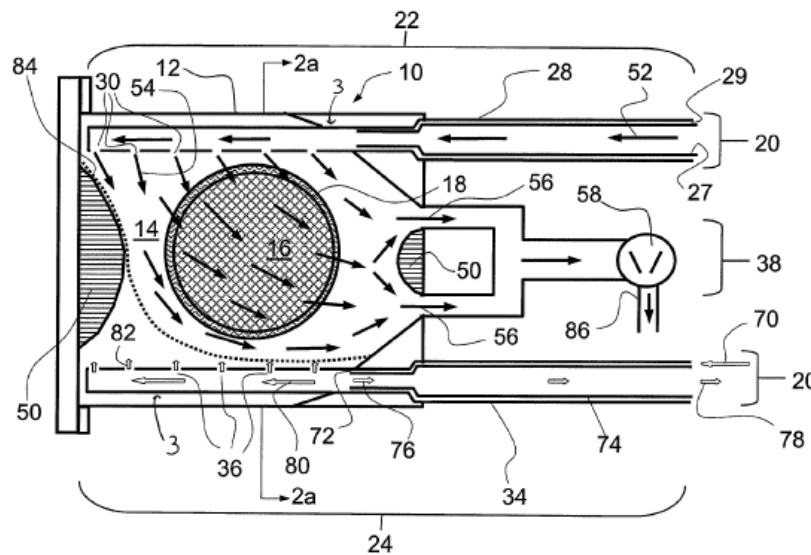


Fig. 1

Figure 1 depicts reactor 10 in which wafer or substrate 16 is moved in and out by wafer handler 18. *Id.* at 4:56–61. The wafer handler also serves as the substrate support and, in a preferred embodiment, keeps the substrate stationary relative to gas injection structure 20 during operation. *Id.* at 4:58–61, 5:3–8.

In illustrated reactor 10, gas injection structure 20 comprises a first gas inlet or injector 22 and a second gas inlet or injector 24. *Id.* at 5:28–29. Purge gas is shown by white arrows and reactant gas is shown by black arrows. *Id.* at 5:41–43. A small amount of purge gas flows during the flow of the first precursor, for example, 5–20% of the flow rate of the purge gas during the following purge step. *Id.* at 5:63–6:6. After the first precursor molecules are chemisorbed onto the wafer or substrate, purging gas flows from the purging gas supply source and a second precursor is supplied to the reaction chamber through second gas inlet or injector 24. *Id.* at 5:53–6:22. During the second precursor flow, a small amount of purge gas can simultaneously flow, for example, 5–20% of the flow rate of the purge gas during the following purge step. *Id.* at 6:50–60. Excess first precursor, excess second precursor, reaction by-products, and/or purging gas is removed from reaction chamber 12 via gas exhaust or outlet 56. *Id.* at 7:5–8.

D. Illustrative Claim

Claim 1, the only independent claim challenged, illustrates the claimed subject matter and is reproduced below:

1. An apparatus for depositing a thin film on a substrate, comprising:
 - a reaction chamber having a reaction space;
 - a substrate holder for holding the substrate within the reaction space;
 - a gas outlet in fluid communication with the reaction space;
 - a gas injector structure positioned with the reaction chamber fixed relative to the substrate during deposition, the gas injector structure comprising:

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