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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/782,935 03/01/2013 Mingwei Zhu 015867USAD01 1848

150369 7590 02/13/2018
Schwabe, Williamson & Wyatt/AMAT
1211 SW Fifth Ave.
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Portland, OR 97204

EXAMINER

BAND, MICHAEL A

ART UNIT PAPER NUMBER

1754

NOTIFICATION DATE DELIVERY MODE

02/13/2018

ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MINGWEI ZHU, VIVEK AGRAWAL,  
NAG B. PATIBANDLA, and OMKARAM NALAMASU

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Appeal 2017-005379  
Application 13/782,935  
Technology Center 1700

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Before LINDA M. GAUDETTE, DONNA M. PRAISS, and  
MERRELL C. CASHION, JR., *Administrative Patent Judges*.

CASHION, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134 from the Examiner's Final Rejection of claims 1, 3–8, 12, and 13. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> Applied Materials, Inc. is the Applicant and is identified as the real party in interest. App. Br. 3.

Claim 1 illustrates the subject matter on appeal and is reproduced below:

1. A multi-chamber system, comprising:
  - a physical vapor deposition (PVD) chamber having a target comprising aluminum nitride for non-reactive sputtering of aluminum nitride at a temperature between 20 and 200 degrees Celsius; and
  - a chamber adapted to deposit un-doped or n-type gallium nitride, or both.

Appellant (App. Br. 4) requests review of the following rejections from the Examiner's Final Office Action:<sup>2</sup>

I. Claims 1, 3, 4, 7, 8, and 12 rejected under 35 U.S.C. § 103(a) as unpatentable over Chiyo (US 7,312,472 B2, issued December 25, 2007) and Vashaei (Z. Vashaei et al., *Influence of Sputtering Parameters on the Crystallinity and Crystal Orientation of AlN Layers Deposited by RF Sputtering Using the AlN Target*, 311 J. Crystal Growth 459–462 (2009)).

II. Claim 13 rejected under 35 U.S.C. § 103(a) as unpatentable over Chiyo, Vashaei, and Hagleitner (US 2008/0042145 A1, published February 21, 2008).

In addition, the Examiner entered the following new ground of rejection in the Answer dated December 15, 2016 (hereinafter referred to as “Ans.”) that was addressed in timely fashion by Appellant in the Reply Brief dated February 13, 2017 (hereinafter referred to as “Reply Br.”)<sup>3</sup>:

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<sup>2</sup> The Final Office Action includes a rejection under 35 U.S.C. § 102(e). Final Act. 2. This rejection has been withdrawn by the Examiner. Ans. 2. Accordingly, the rejection is not before us for review on appeal.

<sup>3</sup> The Reply Brief dated February 13, 2017 includes the arguments presented in the principal brief. *Compare* Appeal Br., *with* Reply Br. We therefore refer to the arguments presented in the Reply Brief for the purposes of this opinion.

III. Claims 5 and 6 rejected under 35 U.S.C. § 103(a) as unpatentable over Chiyo, Vashaei, and Droopad (US 2001/0013313 A1, published August 16, 2001).

Appellant argues claims 1, 3, 4, 7, 8, 12 and 13 together (Rejections I and II). Reply Br. 1. For claims 5 and 6 (Rejection III), Appellant relies on the arguments presented for claim 1 and does not distinguish the additional features of these claims based on the additionally cited reference. Reply Br. 2. Accordingly, we decide the appeal as to all grounds of rejection based on the arguments made by Appellant in support of patentability of claim 1.

#### OPINION

After review of the respective positions provided by Appellant and the Examiner, we AFFIRM the rejections of claims 1, 3–8, 12 and 13 under 35 U.S.C. § 103(a) for the reasons presented by the Examiner. We add the following for emphasis.

Claim 1 is directed to a multi-chamber system comprising a physical vapor deposition (PVD) chamber having a target comprising aluminum nitride (AlN) for non-reactive sputtering of aluminum nitride at a temperature between 20 and 200 degrees Celsius.

The Examiner finds Chiyo discloses a multi-chamber system comprising a sputtering apparatus (PVD chamber) comprising an Al target for depositing an AlN buffer layer and a chamber having an MOCVD<sup>4</sup> apparatus capable of forming an n-type GaN layer. Final Act. 4; Chiyo Figure 1, col. 6, ll. 1–37). The Examiner finds Chiyo does not disclose the use of a target comprising AlN which is capable of being non-reactively

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<sup>4</sup> Metal organic chemical vapor deposition. Chiyo 4:28–30.

sputtered at a temperature between 20–200°C. Final Act. 4. The Examiner finds Vashaei teaches sputtering of AlN layers through non-reactive RF sputtering from an AlN target at a temperature range of 200–400°C, which results in an AlN layer with improved crystallinity. Final Act. 4; Vashaei 459 (Abst.), 460 (Table 1). The Examiner determines it would have been obvious to one of ordinary skill in the art to incorporate an AlN target and sputter at a temperature of 200°C in Chiyo’s PVD chamber to gain the advantage of improving crystallinity, as taught by Vashaei. Final Act. 4.

We have considered Appellant’s arguments (Reply Br. 1–2) but are unpersuaded of error in the Examiner’s determination of obviousness. Appellant’s arguments are primarily based on each individual reference cited in the rejection as failing to disclose a PVD chamber having a target comprising aluminum nitride for non-reactive sputtering of aluminum nitride at a temperature between 20 and 200 degrees Celsius, as required by the subject matter of independent claim 1. Reply Br. 2. That is, Appellant’s statements merely point out what a claim recites and, thus, are not considered arguments for patentability of the claim. *See* 37 C.F.R. § 41.47(c)(1)(iv).

In addition, Appellant’s statements do not address the Examiner’s reasons for combining the teachings of the cited art. Final Act. 4; Ans. 9–12. It is well established that nonobviousness cannot be established by attacking the references individually when the rejection is predicated upon a combination of prior art disclosures. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *In re Keller*, 642 F.2d 413, 425–26 (CCPA 1981) (“The test [for obviousness] . . . is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”).

The Examiner presents a number of reasons why the combined teachings of the cited art would have led one skilled in the art to the claimed invention. Ans. 9–12. Given the reasons noted above, Appellant does not adequately explain why one skilled in the art would not have been capable of modifying the PVD chamber of Chiyo’s multi-chamber device to incorporate an AlN target for non-reactive sputtering of the target at a temperature of 200°C for the reasons disclosed by Vashaei. Final Act 4; *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”); *see In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985) (skill is presumed on the part of one of ordinary skill in the art); *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969). Appellant has not adequately explained why one skilled in the art would not have expected Vashaei’s AlN target for non-reactive sputtering at a temperature of 200°C to be suitable for use in Chiyo’s PVD chamber. Further, Chiyo distinguishes between sputtering and reactive sputtering, which suggests the use of non-reactive sputtering and additionally supports the Examiner’s decision. Chiyo col. 3, ll. 38–41 (“(Physical Vapor Deposition) method such as *sputtering*, *reactive sputtering*” (emphasis added)).

Thus, Appellant does not point to reversible error in the Examiner’s determination of obviousness.

Accordingly we affirm the Examiner’s prior art rejections of claims 1, 3–8, 12, and 13 under 35 U.S.C. § 103 (a) for the reasons presented by the Examiner and given above.

Appeal 2017-005379  
Application 13/782,935

DECISION

The Examiner's rejections of claims 1, 3–8, 12 and 13 under 35 U.S.C. § 103(a) are affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED