

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 45

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* KAM S. LAW,  
ROBERT ROBERTSON,  
PAMELA LOU,  
MARC M. KOLLRACK,  
ANGELA LEE,  
and  
DAN MAYDAN

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Appeal No. 1997-3514  
Application No. 08/303,566

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HEARD: OCTOBER 23, 2001

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Before WARREN, TIMM, and DELMENDO, *Administrative Patent Judges*.  
TIMM, *Administrative Patent Judge*.

***DECISION ON APPEAL***

Applicants' appeal the decision of the Primary Examiner finally rejecting claims 1-13, which are all of the claims pending in this application. We have jurisdiction under 35 U.S.C. § 134.

### ***THE INVENTION***

According to Appellants, the invention relates to a process of depositing amorphous silicon onto a glass substrate by plasma chemical vapor deposition (plasma CVD) (specification, page 1, lines 5-9). The process is conducted at specific pressures and temperatures in a variable spacing CVD reactor. Appellants indicate that the use of those pressures and temperatures in the specified reactor results in deposition rates of about 500-3000 angstroms per minute, rates which are said to be an order of magnitude higher than prior art processes (specification, page 9, lines 2-8). Claim 1 is illustrative of the process on appeal:<sup>1</sup>

1. A plasma chemical vapor deposition process comprising depositing an amorphous silicon layer from a precursor gas mixture of silane and hydrogen onto a glass substrate at a temperature in a range of about 270-350°C and a pressure of at least about 0.8 torr in a vacuum chamber while maintaining a spacing between the gas inlet manifold and the substrate so that the silicon deposition rate is optimized.

### ***THE EVIDENCE***

As evidence of unpatentability, the Examiner relies upon the following prior art references:

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<sup>1</sup>We note that claim 1 was incorrectly reproduced in the Appendix to the Brief. Therefore, we reproduce the claim as set forth in the Response under 37 CFR § 1.115 filed, according to the certification of mailing, on May 6, 1996 (Paper No. 31) as further amended by the Response under 37 CFR § 1.116 filed, according to the certificate of mailing, on October 9, 1996 (Paper No. 34) entered as per the Advisory Action mailed November 4, 1996 (Paper No. 35).

Dohjo et al. (Dohjo)	4,905,066	Feb. 27, 1990
Hey et al. (Hey)	4,987,856	Jan. 29, 1991
Iwamoto et al. (Iwamoto)	5,258,207	Nov. 02, 1993
Yamagishi et al. (Yamagishi)	5,264,710	Nov. 23, 1993
Kenmotsu et al. (Kenmotsu) (published Japanese Patent Application)	62-136870	Jun. 19, 1987

### ***THE REJECTIONS***

Claims 1, 3, and 5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamagishi in view of Hey and Iwamoto. These three references serve as the foundation for the rejection of all the other claims. To reject claim 6, the Examiner further adds Kenmotsu. Dohjo is added to reject claims 7-9, 12, and 13. Both Kenmotsu and Dohjo are added to reject claims 10 and 11. We reverse all the rejections because the Examiner has failed to establish that the combination of Yamagishi, Hey, and Iwamoto, the references used to reject independent claim 1, would have led one of ordinary skill in the art to perform the process using a pressure and temperature within the ranges required by that claim.

### ***OPINION***

The Examiner states that Yamagishi describes, in Examples 1-3, a plasma CVD process for forming amorphous silicon films on a glass substrate heated to 200EC using silane at a pressure range of 0.4 to 3 Torr (Answer, page 3). We note that Examples 1 and 2 specify a pressure of 3 Torr. This pressure is at least about 0.8 Torr as required by claim 1. However, the 200EC temperature specified

in all of the Examples of Yamagishi is not within the 270-350EC range required by the process of claim

1. The Examiner fails to note this temperature difference in the rejection (Answer, page 3).

The secondary references do not describe a plasma CVD process in which the substrate is heated to a temperature of 270-350EC. Hey is included in the rejection for its description of a plasma CVD apparatus and this reference contains no discussion of the temperature and pressure requirements of plasma CVD. Iwamoto describes a plasma CVD process, but specifically limits the substrate temperature to a level below 100EC (col. 1, lines 63-67).

Furthermore, as evidenced by the combination of Yamagishi and Iwamoto, one of ordinary skill in the art would have been led to heat the substrate to a temperature lower than that required in the claimed process. The Examiner rationalizes that one of ordinary skill in the art would have recognized from Iwamoto that using a higher substrate temperature and higher pressure would have resulted in a higher deposition rate (Answer, pages 9 and 10). The problem with this conclusion is that both Iwamoto and Yamagishi are concerned with producing amorphous silicon films with high photoelectric conductivity and photo-semiconductors made therefrom (Iwamoto, col. 1, lines 12-17; Yamagishi, col. 1, lines 11-33). Iwamoto specifically indicates that high photoelectric conductivity is only possible when the substrate is held at a temperature below 100EC. The combination of Yamagishi with Iwamoto would have led one of ordinary skill in the art to heat the glass substrate to a temperature

lower than 270-350EC to obtain the high photoelectric conductivity required for the photo-semiconductor applications envisioned by both references.

Because the Examiner failed to provide any evidence or convincing rationale that one of ordinary skill in the art would have found it obvious to conduct the process at the combination of temperatures and pressures required by claim 1, the independent claim, we conclude that the Examiner has failed to establish a *prima facie* case of obviousness with respect to the subject matter of claim 1 and claims 2-13 which depend therefrom. We note that neither Kenmotsu nor Dohjo, as relied on by the Examiner to reject the various dependent claims, fill the evidentiary gap.

**CONCLUSION**

To summarize, the decision of the Examiner to reject claims 1-13 under 35 U.S.C. § 103 is reversed.

**REVERSED**

CHARLES F. WARREN	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
CATHERINE TIMM	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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ROMULO H. DELMENDO	)	
Administrative Patent Judge	)	

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