

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. 9

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte STEPHEN R. GILBERT, THEODORE S. MOISE  
and SCOTT R. SUMMERFELT

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Appeal No. 2001-2107  
Application No. 09/349,439

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ON BRIEF

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Before HAIRSTON, RUGGIERO, and GROSS, Administrative Patent Judges.  
HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 13, 14 and 17 through 23.

The disclosed invention relates to a method of depositing a thin film of a dielectric material onto a surface from the vapor phase. A first portion of the dielectric film is deposited onto the surface while applying an RF bias to the surface, and a second portion of the dielectric film is deposited after the RF bias has been removed from the surface.

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Claim 13 is illustrative of the claimed invention, and it reads as follows:

13. A method of forming dielectric layers, comprising the action of depositing a thin film of a dielectric material with an anisotropic ferroelectric polarization onto a surface from the vapor phase, while applying an RF bias to said surface during a first portion of said depositing and removing said RF bias during a second portion of said depositing.

The references relied on by the examiner are:

Lampe et al. (Lampe)	5,146,299	Sept. 8, 1992
Anderson et al. (Anderson)	5,390,072	Feb. 14, 1995
Paz de Araujo et al. (Paz de Araujo)	5,519,234	May 21, 1996
Drab et al. (Drab)	5,638,252	June 10, 1997

Wolf et al. (Wolf), Silicon Processing for the VLSI Era, Lattice Press, Vol. 1, page 174 (1990).

Claims 13, 14, 17 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lampe in view of Wolf.

Claims 18 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lampe in view of Wolf and Anderson.

Claims 20 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lampe in view of Wolf and Drab.

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Lampe in view of Wolf and Paz de Araujo.

Reference is made to the brief (paper number 7) and the answer (paper number 8) for the respective positions of the appellants and the examiner.

OPINION

We have carefully considered the entire record before us, and we will reverse the 35 U.S.C. § 103(a) rejection of claims 13, 14 and 17 through 23.

The examiner acknowledges (answer, page 3) that the method of forming a dielectric layer during the vapor phase in Lampe “does not specifically disclose the application of RF bias to the surface during a first portion of the deposition and removing it (RF bias) during a second portion of the deposition.” According to the examiner (answer, page 3), “Wolf at page 174 teaches the pulsing of the plasma to reduce the depletion effect nonuniformities.” Based upon the teachings of Wolf, the examiner is of the opinion (answer, page 3) that “it would have been obvious to pulse the plasma (i.e. apply the RF bias to the surface during a first portion of the deposition and removing it (RF bias) during a second portion of the deposition[.]) In [sic, in the] Lampe process steps to reduce the depletion effect nonuniformities.”

The response (brief, page 3) to the examiner’s position is that:

Appellants reply that the Wolf plasma pulses are contrary to the requirement of the independent claims 13, 14, 17, and 23 in that the claimed deposition also occurs when the bias is removed. Indeed, clause (d) of each of independent claims 17 and 23 explicitly has a second subfilm formed after removal of the applied bias. In contrast, Wolf turns off the plasma and stops the deposition “so that during the off phase of the duty cycle, fresh reactant gases fill the tube and replace depleted gases.” Consequently, combining Wolf with Lampe does not suggest any of the independent claims, and the claims are patentable over the references.

Lampe teaches that “[a]nother technique used to combat depletion effect nonuniformities is to pulse the plasma, so that during the off phase of the duty cycle, fresh reactant gases fill the tube

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and replace depleted gases.” An on phase and an off phase of the duty cycle (i.e., RF bias voltage) are clearly taught by Lampe. On the other hand, Lampe never states that the “fresh reactant gases [that] fill the tube and replace depleted gases” are deposited onto the wafers during the off phase. In the absence of such a teaching, the examiner is merely relying on speculation to fill in the missing gap in the teachings of Wolf. An obviousness rejection can not be sustained based upon the examiner’s speculation as to the teachings of a reference. Stated differently, evidence in the record is needed to support the examiner’s speculative conclusion that the claimed invention would have been obvious to the skilled artisan based upon the teachings of the applied references. In re Lee, 277 F.3d 1338, 1344-45, 61 USPQ2d 1430, 1434-35 (Fed. Cir. 2002). In summary, the 35 U.S.C. § 103(a) rejection of claims 13, 14, 17 and 23 is reversed.

The 35 U.S.C. § 103(a) rejection of claims 18 through 22 is reversed because the teachings of Anderson, Drab and Paz de Araujo do not cure the noted shortcoming in the teachings of Wolf.

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DECISION

The decision of the examiner rejecting claims 13, 14 and 17 through 23 under 35 U.S.C. § 103(a) is reversed.

REVERSED

KENNETH W. HAIRSTON	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
JOSEPH F. RUGGIERO	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
ANITA PELLMAN GROSS	)	
Administrative Patent Judge	)	

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