

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROLAND SAUERBREY
and
MICHAEL C. SMAYLING

Appeal No. 1998-3000
Application No. 08/485,412

ON BRIEF

Before THOMAS, HAIRSTON, and HECKER, Administrative Patent Judges.

HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 2 through 18, 20 through 22, 24 through 29, 51, 55 through 58, 70, 73, 74, 76, 101 through 103 and 112 through 120.

The disclosed invention relates to the fabrication of an integrated circuit, a transistor, or a printed wiring board via selective exposure of a radiation sensitive

polyimide/polymer material to electromagnetic radiation.

Claims 6, 24 and 51 are illustrative of the claimed invention, and they read as follows:

6. An integrated circuit comprising at least a pair of extended conductive elements lying in distinct substantially parallel planes, and a radiation sensitive polymer material interposed between said pair of said conductive elements, said radiation sensitive polymer material dosed with electromagnetic radiation to have different conductivities in different portions forming a continuous body with a substantially smooth surface from portion to portion, with said pair of conductive elements electrically linked by a said portion wherein the radiation sensitive polymer material comprises a polybenzimidazole (PBI) material.

24. A transistor comprising:

a radiation sensitive polymer material dosed with electromagnetic radiation to have conductive regions separated by another region of a lower conductivity in the radiation sensitive material, and

a conductive material deposited over the region of lower conductivity;

wherein the radiation sensitive material comprises a polyimide.

51. A printed wiring board comprising a base including selectively irradiated radiation sensitive polyimide material, the board further having a conductor layer affixed to said base and patterned into a set of conductors wherein said radiation sensitive material is dosed with electromagnetic radiation to have different conductivities in different portions thereof, at least two of the conductors electrically connected by a portion of the dosed radiation sensitive material.

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The references relied on by the examiner are:

Herndon et al. (Herndon)	4,843,034	
Jun. 27, 1989		
Mihara	4,922,317	May 1,
1990		
Tanaka et al. (Tanaka)	5,100,762	Mar. 31,
1992		
		(filed Jul. 9,
1990)		
Schoch, Jr. et al. (Schoch)	5,250,388	Oct. 5,
1993		
		(filed May 31,
1988)		

Jensen, "Polyimides as Interlayer Dielectrics for High-Performance Interconnections of Integrated Circuits," Polymers For High Technology, 466-83 (American Chemical Society, 1987).

Claims 2 through 7, 9 through 13, 20 through 22, 24 through 29, 70, 73, 74, 76, 101 through 103 and 112 through 120 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schoch considered alone or in combination with Tanaka.

Claims 8, 14 through 18, 25, 70, 73, 74 and 76 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schoch and Tanaka in further view of Herndon.

Claims 15 through 18, 29, 51, 55 through 58 and 112 through 120 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schoch, Tanaka and Herndon in further view

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of Jensen.

Claims 11 and 16 stand rejected 35 U.S.C. § 103(a) as being unpatentable over Schoch, Tanaka, Herndon and Jensen in further view of Mihara.

Reference is made to the brief and the answer for the respective positions of the appellants and the examiner.

OPINION

The obviousness rejection of claims 2 through 18, 20 through 22, 24 through 29, 51, 55 through 58, 70, 73, 74, 76, 101 through 103 and 112 through 120 is reversed.

According to the examiner (Answer, page 5), "Schoch teaches several polymers and explicitly uses ion irradiation in the processing steps," and "Tanaka, in column 1 lists polymers and defines 'radiation sensitive' to mean 'all high-energy radiations including ultraviolet light, deep-ultraviolet light, electron beams and X-rays.'" The examiner concludes (Answer, page 5) that:

Therefore the polymers of Schoch are considered radiation sensitive both in the broad sense and also by the definition as used by Tanaka. For these reasons, the claims are considered obvious either over Schoch taken alone, or further considering Tanaka's definition of "radiation sensitive".

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Although we agree with the examiner's assessment of the respective individual teachings of both Schoch and Tanaka, we nevertheless agree with appellants (Brief, page 6) that:

The combination of Schoch and Tanaka is not only improper, it does not teach as the Examiner has suggested. First, the Schoch reference involves the conversion of a material from a substantially non-conductive state to a conductive state by the use of ion radiation. Tanaka, on the other hand, involves the conversion of a photoresist layer from a more or less soluble state based on impinging energy. It would not have been obvious to one of ordinary skill in the art to combine these two references because one skilled in the art of semiconductor interconnects is not skilled in the art of photoresist and one skilled in the art of photoresist is not skilled in the art of semiconductor interconnects.

Second, Tanaka does not equate ion radiation to electromagnetic radiation.^[1] Tanaka merely states that photoresist can be developed using various mechanisms, which includes "all high-energy radiations including ultraviolet light, deep-ultraviolet light, electron beams and X-rays." See U.S. Patent Number 5,100,762, column 1, lines 67-68. The act of making photoresist more or less soluble is clearly not the same as making a material more conductive. These involve different phenomena and therefore should not be equated.

The obviousness rejection of claims 2 through 7, 9

¹According to appellants (specification, page 51), ions are made of particle radiation as opposed to photon or electromagnetic radiation.

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through 13, 20 through 22, 24 through 29, 70, 73, 74, 76, 101 through 103 and 112 through 120 is reversed because we are not convinced by the examiner's reasoning that the skilled artisan would have changed the ion radiation in Schoch to another type of radiation based upon the teachings of Tanaka.

The obviousness rejections based upon the additional teachings of Herndon, Jensen and Mihara are reversed because the shortcomings in the teachings of Schoch and Tanaka are not cured by the teachings of these references.

DECISION

The decision of the examiner rejecting claims 2 through 18, 20 through 22, 24 through 29, 51, 55 through 58, 70, 73, 74, 76, 101 through 103 and 112 through 120 is reversed.

REVERSED

JAMES D. THOMAS
Administrative Patent Judge

KENNETH W. HAIRSTON
Administrative Patent Judge

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