

The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JACK HWANG and MITCHELL C. TAYLOR

Appeal No. 2005-0579
Application No. 09/887,910

ON BRIEF

Before KIMLIN, WARREN and KRATZ, Administrative Patent Judges.
KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-22.

Claim 1 is illustrative:

1. A method of making a semiconductor transistor, comprising:

locating a substrate of a doped semiconductor material in a chamber;

introducing a gas into the chamber;

repeatedly increasing and decreasing a plasma generating voltage potential across the gas in the chamber between a cathode and an anode while the substrate is in the chamber, a transient ion plasma generating from the gas after an increase in magnitude of the plasma generating voltage potential and degenerating after

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a decrease in magnitude of the plasma generating voltage potential;

repeatedly increasing and decreasing an implantation voltage potential between the ion plasma and the substrate, ions of the plasma accelerating towards and implanting into a gate dielectric layer formed on the substrate after an increase in magnitude of the implantation voltage potential; and

forming a conductive transistor gate on the dielectric layer implanted with the ions.

The examiner relies upon the following references as evidence of obviousness:

Aronowitz et al. (Aronowitz)	6,087,229	Jul. 11, 2000
Goeckner et al. (Goeckner)	6,335,536 B1	Jan. 1, 2002 (filed Oct. 27, 1999)
Chen	6,432,780 B2	Aug. 13, 2002 (filed Feb. 28, 2001)

Appellants' claimed invention is directed to a method of making a semiconductor transistor which comprises repeatedly increasing and decreasing an implantation voltage potential between an ion plasma and a substrate of a doped semiconductor material. The ion plasma is generated from a gas, such as nitrogen, and the ions are accelerated towards and implanted into a gate dielectric layer on the substrate. A conductive transistor gate is formed on the dielectric layer that is implanted with the ions.

Appealed claims 1-12, 14, 15 and 20-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goeckner in view of

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Aronowitz. Claims 13 and 16-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goeckner in view of Aronowitz and further in view of Chen.

Appellants submit at page 7 of the Brief that "[f]or the purpose of this appeal, all the claims stand or fall together." Accordingly, since appellants have not separately addressed the examiner's § 103 rejection of claims 13 and 16-19 over the combination of Goeckner, Aronowitz and Chen, all the appealed claims stand or fall together with claim 1, and we will limit our consideration to the examiner's § 103 rejection of claim 1 over Goeckner in view of Aronowitz.

We have thoroughly reviewed each of appellants' arguments for patentability, as well as the affidavit evidence relied upon in support thereof. However, we are in complete agreement with the examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the examiner's rejections for the reasons set forth in the Answer, which we incorporate herein, and we add the following primarily for emphasis.

Appellants acknowledge that "[a] tool is described in the present patent application from page 5, line 3 to page 9, line 4,

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which is essentially the same as the tool described in Goeckner" (page 7 of Brief, last paragraph). It is the examiner's position that, based on the combined teachings of Goeckner and Aronowitz, it would have been obvious for one of ordinary skill in the art to modify the ion implantation process of Goeckner to employ pulsed low voltage nitrogen plasma doping to form a transistor gate on the dielectric layer. The sole argument advanced by appellants is that "[a]n inventor has submitted an affidavit stating his reasons why one skilled in the art would not be inclined to use the tool in Goeckner to carry out the invention as claimed" (id.).

Jack Hwang, one of the present inventors, is the author of the Affidavit relied upon by appellants. The affiant refers to the tool of Goeckner as "the Varian tool," and states that "[t]he Varian tool is typically used to implant ions to form source and drain regions of transistors" (paragraph 4 of Affidavit). The affiant further explains that appellants have modified the Varian tool to provide one order of magnitude less power, and that "[t]he application is also different in that our tool is used for implanting ions into a gate dielectric layer of a transistor" (paragraph 5 of Affidavit). Affiant adds that he has a background in ion implantation and was transferred to a group

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that specializes in forming gate dielectric layers, and that "I believe that the only reason why the Varian tool found application in the formation of gate dielectric layers is because I was transferred, and was able to apply the knowledge gained in this prior ion implantation field to the formation of gate dielectric layers" (paragraph 6 of Affidavit). Affiant further states that "[t]he people of Varian were quite surprised to learn that the energy levels of their machine can be reduced by one order of magnitude and still find a new application" (paragraph 7 of Affidavit). Affiant concludes by stating "I believe that a person, such as employed by Varian, having skill in the art and having knowledge of the prior art, would not have been able to modify the prior art to render the present invention" (paragraph 8 of Affidavit).

Like the examiner, we find appellants' argument and supporting affidavit to be non-probative of nonobviousness. The fundamental flaw in appellants' argument and evidence is that they fail to address the thrust of the examiner's rejection. In particular, the examiner's conclusion of obviousness is based on the collective teachings of Goeckner and Aronowitz. Indeed, it is well settled that the proper inquiry in the determination of obviousness is what the references, taken collectively, would

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have suggested to one of ordinary skill in the art. In re Keller, 642 F.2d 413, 426, 208 USPQ 871, 882 (CCPA 1981). In the present case, however, appellants have not submitted any rebuttal to the examiner's rationale that one of ordinary skill in the art would have been motivated by the teachings of Aronowitz to modify the process of Goeckner in order to form an implanted gate dielectric layer. Neither appellants' counsel nor the affiant explains why one of ordinary skill in the art would not consider the teachings of Aronowitz applicable to the apparatus of Goeckner. Nor does the affiant even state that he and his co-inventor were even aware of the Aronowitz disclosure. Furthermore, the affiant's belief that a person employed by Varian would not have been able to modify the prior art to result in the present invention is of little probative value in the absence of evidence that such a Varian employee was aware of the Aronowitz disclosure. Consequently, inasmuch as appellants have not addressed the combined prior art as a whole, as required, the prima facie case established by the examiner has not been rebutted.

In conclusion, based on the foregoing, the examiner's decision rejecting the appealed claims is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective Sep. 13, 2004; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat. Office 21 (Sep. 7, 2004)).

AFFIRMED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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CHARLES F. WARREN)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
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PETER F. KRATZ)	
Administrative Patent Judge)	

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