

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 37

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EMILY A. GROVES, WAYNE E. BAILEY, DOUGLAS E. PARADIS
and HOMER K. CHEUNG

Appeal No. 1995-3416
Application No. 08/127,707¹

ON BRIEF

Before KIMLIN, PAK and OWENS, Administrative Patent Judges.
KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 26-29. Claims 1-9, the other claims remaining in the present

¹ Application for patent filed September 28, 1993. According to appellants, this application is a continuation of Application No. 07/850,643, filed March 13, 1992.

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application, have been allowed by the examiner. Claim 26 is illustrative:

26. A method of forming a semiconductor device comprising the steps of:

(a) providing a silicon substrate of a first conductivity type;

(b) forming an electrically insulating layer on said substrate having a bird's beak region at an edge portion thereof;

(c) implanting ions of said first conductivity type into said substrate and beneath said electrically insulating layer, the concentration of said ions of said first conductivity type being greater beneath said bird's beak region than beneath the remainder of the portion of said substrate beneath said electrically insulating layer; and

(d) completing fabrication of said semiconductor device in the region of said substrate immediately adjacent said bird's beak region.

In the rejection of the appealed claims, the examiner relies upon the following reference:

Kurakami et al. (Kurakami) 4,357,747 Nov. 9, 1982

Appellant's claimed invention is directed to a process of forming a semiconductor device having a bird's beak region at an edge portion of an insulating layer, and increasing the impurity, dopant concentration in the substrate under the bird's beak region in order to increase the threshold voltage of this area and improve the radiation tolerance of the device

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(see specification at page 3, last sentence of first paragraph).

Appealed claims 26-29 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kurakami.²

Upon careful consideration of the opposing arguments presented on appeal, we find that the examiner has properly rejected appealed claims 26 and 27 under 35 U.S.C. § 102(b) over Kurakami. However, we cannot sustain the examiner's rejection of claims 28 and 29.

It is well settled that when a claimed process reasonably appears to be substantially the same as a process disclosed by the prior art, the burden is on the applicant to prove with objective evidence that the prior art process does not necessarily or inherently possess characteristics attributed to the claimed process. In such situations it matters not whether the rejection is based on § 102 or § 103. In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990); In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

² The examiner's final rejection of claims 26-29 under 35 U.S.C. § 112, second paragraph, has been withdrawn by the examiner. See page 2 of the Answer.

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In the present case, we agree with the examiner that it is reasonable to conclude that regions 210 and 210' of Kurakami, which are described as having a higher concentration of P-type impurity than silicon substrate underlying field oxide layer 207, extend to some degree beneath the bird's beak region of oxide 207, at least to the non-specified degree claimed. Indeed, the very words of Kurakami attest to the reasonableness of this conclusion. In relevant part, Kurakami expressly teaches that the width C of channel region 202 is not affected even if a protrusion 212 of region 210 extends under the oxide film 207 (column 5, lines 56-59). In our view, Figure 2B and the accompanying disclosure of Kurakami fairly establishes a prima facie case of anticipation that properly shifts to appellants the burden of proving that the dopant implantation of Kurakami does not necessarily result in some concentration of dopant beneath the bird's beak region being greater than the concentration beneath the remaining portion of the substrate beneath the insulating layer. However, appellants have presented no such objective evidence to rebut the prima facie case of anticipation.

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Appellants maintain at page 5 of the principal brief that "it is not seen wherein Kurakami et al. implants through the gate oxide to form regions 210 and 210'." Appellants point out that "Kurakami et al. clearly state at column 1 [sic, 5], lines 37 to 40 'by making use of the gate electrode 203 as a mask to form P+type regions 210 and 210' . . .'" (page 5 of principal brief). However, the reference specifically discloses that "[e]specially where ion implantation is carried out, it may be effected through the gate insulator film without removing the gate insulator film" (column 5, lines 45-47, emphasis added).

Appellants also contend that "there would be no reason, applying the Examiner's reasoning, to believe that the implant would not travel through a sufficient amount of field oxide to provide the higher concentration even beyond the bird's beak region, thereby not being readable of the claims on appeal" (page 5 of principal brief). First, the appealed claims do not preclude a concentration gradient beneath the insulating layer that diminishes in the direction beyond the bird's beak region, yet still has a greater concentration beneath the bird's beak region than beneath the remainder of the area

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beneath the electrically insulating layer. Second, appellants have not defined the bird's beak region as having any clear line of demarcation beneath the insulating layer.

Regarding separately argued claim 27 which defines the substrate as P-type, Kurakami discloses that substrate 208 is a P-type semiconductor (column 5, lines 34 and 35).

As for separately argued claims 28 and 29, which recite "the step of providing a layer of silicon nitride extending over a portion of said bird's beak," the examiner has not pointed to any disclosure of Kurakami that describes this feature. Indeed, it does not appear that the examiner has responded to the separate argument for claims 28 and 29 at page 6 of the principal brief. Accordingly, we are constrained to reverse the examiner's rejection of claims 28 and 29.

In conclusion, based on the foregoing, the examiner's rejection of claims 26 and 27 is affirmed, whereas the rejection of claims 28 and 29 is reversed. The examiner's decision rejecting the appealed claims is affirmed-in-part.

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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).

AFFIRMED-IN-PART

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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CHUNG K. PAK)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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