

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JACK HWANG, MITCHELL TAYLOR, CRAIG ANDYKE,  
MARK ARMSTRONG, JERRY ZIETZ, HAROLD KENNEL,  
STEPHEN CEA, THOMAS HOFFMAN and SEOK-HEE LEE

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Appeal 2008-0116  
Application 10/306,320  
Technology Center 1700

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Decided: April 14, 2008

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Before CHARLES F. WARREN, CATHERINE Q. TIMM, and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1-3, 5-8, 10-18. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

## I. BACKGROUND

The invention relates to the ion implantation of carbon and an n-type dopant, particularly phosphorous, to form an n-type source drain junction. Claims 1 and 11 are illustrative of the subject matter on appeal:

1. A method comprising:

ion implanting carbon and an n-type dopant at a dosage higher than 1E15 atoms per square centimeter to form an n-type source drain junction.

11. A method comprising:

implanting carbon in a source drain region;  
implanting phosphorous in the source drain region; and  
implanting a polysilicon structure with carbon and phosphorous.

The Examiner relies on the following prior art references to show unpatentability:

Yamazaki et al.	US 5,821,563	October 13, 1998
Gardner et al.	US 5,885,861	March 23, 1999
Park et al.	US 6,303,450	October 16, 2001

The Examiner made the following rejections:

1. Claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as obvious over Gardner et al. (“Gardner”) in view of Park et al. (“Park”); and
2. Claims 1-3, 5-8, 10 and 13-18 were rejected under 35 U.S.C. § 103(a) as obvious over Gardner in view of Park and further in view of Yamazaki et al. (“Yamazaki”).

Appellants group the claims to correspond to the Examiner’s rejections and do not provide separate arguments for any of the dependent

claims. Thus, we decide these grounds of rejection on the basis of claims 1 and 11. *See* 37 C.F.R. § 41.37(c)(1)(vii).

## II. DISCUSSION

Appellants argue that the Examiner has improperly shifted the burden to Appellants to show criticality of the dosage of “higher than 1E15 atoms per square centimeter” recited in claim 1 because the cited references do not teach the claimed range (App. Br. 10-11) or, alternatively, because the Examiner has not demonstrated a *prima facie* case of obviousness in that the Examiner has not demonstrated any rationale to modify the teachings of Yamazaki or combine the teachings of Yamazaki with the other references. (Reply. Br. 2).

The Examiner maintains that a *prima facie* case of obviousness has been established because it is obvious to find optimum or workable ranges by routine experimentation (Ans. 9) and because Yamazaki teaches a concentration close enough to the claimed range to expect the claimed range would have the same properties taught by Yamazaki. (Ans. 10). Thus, the Examiner argues that the burden properly shifts to the Appellants to show criticality of the claimed dosage range. (Ans. 10).

The issue on appeal arising from the contentions of Appellants and the Examiner is: Have Appellants shown that the Examiner reversibly erred in shifting the burden to Appellants to show criticality of the claimed range “higher than 1E15 atoms per square centimeter”?

We set forth the following Findings of Facts (FF):

1. Gardner does not teach any particular dosages for implanting phosphorous as an n-type dopant into source/drain regions. (Gardner, col. 5,

ll. 49-51). Likewise, Park does not teach any dosages for implanting phosphorous dopants into source/drains. (Park, col. 3, ll. 21-23.)

2. Yamazaki teaches that “phosphorus was added by ion implantation at a dose of  $1 \times 10^{15} \text{ cm}^{-2}$ , i.e., 1E15, to the area which will become a source 5' and a drain 6' for the n-TFT.” (Yamazaki, col. 11, ll. 23-26).

We determine that the Examiner has established a *prima facie* case of obviousness and properly shifted the burden to the Appellants to show criticality of the claim dosage range.

First, regarding claims 11 and 12, Appellants rely on the same reasons for patentability argued with respect to claims 1-3, 5-8, 10 and 13-18 to demonstrate patentability of claims 11 and 12. (App. Br. 11). However, neither claim 11 nor claim 12 recites the dosage range on which Appellants base the argument regarding claims 1-3, 5-8, 10 and 13-18. Since Appellants provide no alternative arguments regarding claims 11 or 12, we affirm the Examiner’s rejection of claims 11 and 12.

We now turn to the separate rejection of claims 1-3, 5-8, 10 and 13-18. We note that Gardner teaches the use and function of implanting phosphorous as an n-type dopant for a source drain junction, but does not teach the dosage. (FF1). Despite its teaching of implanting n-type dopants for source drain junctions, we note that Park also does not teach any dosages. (FF1). One of ordinary skill in the art would have had to determine, based on the teachings of Gardner and Park, a workable dosage for the ion implantation of phosphorous through routine experimentation. As such, we find that the dosage for implanting phosphorous for source drain junctions is a result-effective variable, which the Appellants admit.

(App. Br. 10). We conclude that one of ordinary skill in the art would have determined a workable or optimal dosage range for implanting phosphorous into source/drain junctions with routine experimentation. *See In re Boesch*, 617 F.2d 272, 276 (CCPA 1980) (“[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.”); *see also In re Aller*, 220 F.2d 454, 456 (CCPA 1955) (“where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

The Examiner bolsters the evidence of what would have been known to one of ordinary skill in the art by relying on the teaching in Yamazaki of implanting  $1 \times 10^{15}$  per square centimeter of phosphorous in a source drain junction. (FF2). The teachings of Yamazaki illustrate the degree, but not necessarily the range limits, to which one of ordinary skill in the art would have known to dose the implanting of phosphorous into source drain junctions. One of ordinary skill in the art, particularly starting with the teachings of Yamazaki, for example, would have arrived at the optimum dosage specified in claim 1 through routine experimentation. *In re Aller*, 220 F.2d at 456.

Since the Examiner relies on optimization of ranges through routine experimentation, we disagree with Appellants that the Examiner has not provided a rationale to modify or combine the teachings of Gardner and Park with the teachings of Yamazaki. Recently, in *KSR Int'l Co. v. Teleflex Inc.*, the Supreme Court set aside any “rigid” application of the teaching, suggestion, motivation (“TSM”) test, advising that: “A person of ordinary skill is also a person of ordinary creativity, not an automaton.” 127 S. Ct. 1727, 1742 (2007). The Federal Circuit, in *In re Peterson*, also instructs us

that “[t]he normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to [optimize ranges].” 315 F.3d 1325, 1330 (Fed. Cir. 2003).

Thus, we agree with the Examiner’s application of Gardner, Park and Yamazaki and conclude that the Examiner has established a prima facie case of obviousness of claim 1.

With our conclusion that the Examiner has provided a prima facie case of obviousness, Appellants can show secondary considerations such as unexpected results or criticality to overcome the prima facie case. *See In re Huang*, 100 F.3d 135, 139 (Fed. Cir. 1996) (if claimed ranges are within the capabilities of one of ordinary skill in the art, the ranges are not patentable “unless the claimed ranges ‘produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art.’”) (*quoting Aller*, 220 F.2d at 456 and *citing In re Woodruff*, 919 F.2d 1575, 1578 (Fed.Cir.1990)). Here, Appellants do not provide any showing of secondary considerations or criticality.

### III. CONCLUSION

The totality of the evidence weighs in favor of a conclusion of obviousness. The Examiner did not reversibly err in shifting the burden to Appellants to show criticality of the claimed range “higher than 1E15 atoms per square centimeter.” Accordingly, we sustain the Examiner's rejections under 35 U.S.C. § 103(a).

### IV. DECISION

The decision of the Examiner is affirmed.

### V. TIME PERIOD FOR RESPONSE

Appeal 2008-0116  
Application 10/306,320

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

tc

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