

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WEIDONG TIAN, JOZEF MITROS, and VICTOR IVANOV

Appeal 2008-3210
Application 10/413,733
Technology Center 2800

Decided: September 19, 2008

Before JOSEPH F. RUGGIERO, MAHSHID D. SAADAT, and KEVIN F. TURNER, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the Final Rejection of claims 1-4, 11-13, and 18-20. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

Appellants' claimed invention relates to methods for reducing capacitor dielectric absorption and voltage coefficients. (Spec. 1:5-7). This is accomplished through the provision of phosphorous or other n-type

Appeal 2008-3210
Application 10/413,733

dopants to the capacitor dielectric structures to mitigate voltage dependent capacitance variations and/or dielectric absorption effects. (Spec. 3:8-12).

Claims 1-22 are pending in the instant application and claims 5-10, 14-17, 21, and 22 are objected to but indicated as containing allowable subject matter¹. Claims 1-4, 11-13, and 18-20 have been rejected over prior art. Independent claim 1 is illustrative of the invention and reads as follows:

1. A method of fabricating a capacitor in a semiconductor device, comprising:
 - providing a first conductive plate structure;
 - forming a dielectric structure proximate the first conductive plate structure;
 - providing n-type dopants to at least a portion of the dielectric structure; and
 - forming a second conductive plate structure proximate the dielectric structure.

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

Fujii US 2001/0007777A1 Jul. 12, 2001

Claims 1-4, 11-13, and 18-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Fujii.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Brief and Answer for the respective details. Only those arguments actually made by Appellants have been considered in this

¹ Final Office Action mailed April 20, 2005.

decision. Arguments which Appellants could have made but chose not to make in the Brief have not been considered and are deemed to be waived [see 37 C.F.R. § 41.37(c)(1)(vii)].

ISSUE

Under 35 U.S.C. § 102(b), with respect to appealed claims 1-4, 11-13, and 18-20, does Fujii disclose all of the elements of those claims to render them anticipated?

FINDINGS OF FACT

1. The Specification details that a capacitor or a semiconductor device having a capacitor is formed by depositing a polysilicon layer and forming a silicide therefrom. A capacitor dielectric is deposited on the silicide, which is doped with phosphorous. A top plate material is formed thereon and patterned to complete the capacitor structure. (Spec. 8:22 – 10:26; Fig. 2A-2I, elements 106, 116, 122, 126, and 128).
2. Independent claims 1, 12, and 19 all recite the step of: “providing n-type dopants to at least a portion of the dielectric.”
3. Fujii discloses a semiconductor device and a manufacturing method thereof that includes a capacitor. The rejection specifically cites a prior art description in Fujii where a silicon dioxide layer is formed and a conductive layer is formed thereon, in a region where the capacitor is to be formed. A phosphorous glass (PSG) layer is formed thereon and a conductive layer of aluminum is formed thereafter. (Abstract; ¶ [0010]; Fig. 20(a), elements 106, 108, 112, 112, and 114).

PRINCIPLES OF LAW

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Calif.*, 814 F.2d 628, 631 (Fed. Cir. 1987).

During examination, the claims must be interpreted as broadly as their terms reasonably allow. *In re Am. Acad. of Sci. Tech Center*, 367 F.3d 1359, 1369 (Fed. Cir. 2004). When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art. *In re Zletz*, 893 F.2d 319, 321-22 (Fed. Cir. 1989).

ANALYSIS

Appellants argue that Fujii does not teach the step of providing n-type dopants to at least a portion of the dielectric, as recited in independent claims 1, 12, and 19. (Br. 15). Appellants argue that the providing step is separate from the step of forming the dielectric structure and Fujii only teaches the formation of a polysilicon layer and the application of a PSG layer. (Br. 15-16). The Examiner finds that the PSG layer is a portion of the dielectric layer which contains n-type dopants and that the claims are not limited to the steps of forming the dielectric and providing the dopants being separate. (Ans. 4). After reviewing the arguments of record from Appellants and the Examiner, we are in general agreement with Appellants' position as stated in the Brief.

The Examiner appears to argue that providing the polysilicon dielectric layer in Fujii satisfies the method step of providing the dielectric

structure and the addition of another layer, the PSG layer, satisfies the next method step of providing dopants to at least a portion of that dielectric structure. (Ans. 4). However, this newly added PSG layer cannot be “a portion” of the previously deposited polysilicon dielectric layer. In other words, the addition of the PSG layer is not the same as providing n-type dopants to at least a portion of the dielectric. (FF. 3). We find no support in Fujii that the addition of the PSG layer would provide dopants to the polysilicon dielectric layer. As such, we do not find this reading of Fujii adequate to teach all of the elements of independent claims 1, 12, and 19.

The Examiner also finds that “one of ordinary skill in the art would have achieved formation of a dielectric structure having a portion provided with n-type dopants such as phosphorus.” (Ans. 4). However, as the Examiner is no doubt aware, a resulting structure does not necessarily anticipate the process of forming that structure. In order to anticipate a method claim, all of the steps of such a claim must be disclosed in a single reference or be shown to occur inherently in the disclosed process. The Examiner has not shown that Fujii discloses all of the method steps of independent claims 1, 12, and 19, nor shown that those steps would occur inherently in the process of forming the disclosed capacitor.

In view of the above discussion, since we are of the opinion that Fujii does not support the anticipation rejection, we do not sustain the rejection of independent claims 1, 12, and 19, nor of claims 2-4, 11, 13, 18, and 20 dependent thereon.

Appeal 2008-3210
Application 10/413,733

CONCLUSION

In summary, we have reversed the Examiner's 35 U.S.C. § 102(b) rejection of claims 1-4, 11-13, and 18-20 over Fujii on appeal.

DECISION

The Examiner's rejection of claims 1-4, 11-13, and 18-20 before us on appeal is reversed.

REVERSED

gvw

TEXAS INSTRUMENTS INCORPORATED
P. O. BOX 655474, M/S 3999
DALLAS, TX 75265