

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. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIDEO SUNAMI, TOKUO KURE, AND YOSHIFUMI KAWAMOTO¹

Appeal No. 1997-1808
Application No. 08/172,101²

HEARD: October 11, 2000

Before JOHN D. SMITH, KRATZ, and TIMM, *Administrative Patent Judges*.
TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 27-39, 41-44, 46-48, 52, 57-60, 62, 63 and 66-76. Claim 48 was canceled and claim 77 was added by the Amendment After Final Rejection filed June 8, 1995. The Examiner has since withdrawn all

¹The real party in interest is Hitachi, Ltd.

²This application is a continuation of Serial Number 07/914,468, filed July 17, 1992, which is a continuation of Serial Number 07/348,131, filed May 5, 1989, which is a continuation of Serial Number 07/093,160, filed September 1, 1987, which is a continuation of Serial Number 06/465,341, filed February 9, 1983. All of these prior applications have been abandoned.

rejections of claims 27-29, 33, 34, 36-39, 44, 46, 47, 52, 57-60, 62, 63, 68-73, and 75-77 (Answer, page 2). Therefore, this appeal is limited to claims 30-32, 35, 41-43, 66, 67, and 74, the only claims currently rejected.

BACKGROUND

The invention relates to a method for fabricating a semiconductor memory containing a storage capacitor on a semiconductor substrate. The storage capacitor is formed by filling a groove formed in the semiconductor substrate with layers of various materials. Formation in a groove rather than on a planar surface of the substrate allows memory capacity to be increased without increasing the plan area of the device.

Claims 30-32, 35, 41-43, 66, 67, and 74 stand rejected under 35 U.S.C. § 112, first paragraph, as lacking an adequate written description of the invention as the subject matter of the rejected claims is not supported by the disclosure as originally filed. We affirm for the following reasons.

OPINION

There are two independent claims on appeal. Claim 74 recites the following:

74. A method of filling a groove in a semiconductor substrate to be used for fabricating a semiconductor device, comprising the steps of:

forming a first conducting film overlying an inside wall of said groove;
forming an insulating film on said first conducting film;
forming a second film overlying said insulating film so that said groove is filled up; and
etching said second film so as to embed the second film in said groove.

The other independent claim, claim 66, is directed to a method for fabricating a semiconductor device and recites the same steps for filling a groove as claim 74.

In making the finding of no support, the Examiner notes that the original disclosure does not include a description, in broad terms, of “forming a first conducting film ...,” “forming an insulating film...,” and “forming a second film ...” as recited in claims 66 and 74 (Answer, pages 5 and 6). The Examiner indicates that the Specification instead provides a description limited to “thermally oxidizing a first polysilicon film to provide an etch stop when etching a second polysilicon layer overlying the first layer.” (Answer, page 6). Appellants, on the other hand, argue that the disclosure as a whole provides support for the subject matter as broadly claimed (Brief, pages 12-22; Reply Brief, in its entirety).

As stated in *In re Kaslow*:

The test for determining compliance with the written description requirement is whether the disclosure of the application as originally filed reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter, rather than the presence or absence of literal support in the specification for the claim language. The content of the drawings may also be considered in determining compliance with the written description requirement.

In re Kaslow, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)(citations omitted).

The purpose of the written description requirement is to guard against the inventor's overreaching by insisting that the invention be recounted in such detail that the inventor's future claims can be determined to encompass subject matter within his or her original creation. *See Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1561, 19 USPQ2d 1111, 1115 (Fed. Cir. 1991). While the Applicant need not describe exactly the subject matter claimed, the description must clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed. 935 F.2d at 1562, 19 USPQ2d at 1116.

A description of the invention which is narrower than the subject matter encompassed by the claims will not always result in a failure to fulfill the written description requirement of 35 U.S.C. § 112, first paragraph. *See In re Smythe*, 480 F.2d 1376, 1382, 178 USPQ 279, 284 (CCPA 1973). However, "the case law does 'not compel the conclusion that a description of a species always constitutes a description of a genus of which it is a part'" either. *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479, 45 USPQ2d 1498, 1503 (Fed. Cir. 1998)(quoting *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1405 (Fed. Cir. 1997)). "It is a truism that a claim need not be limited to a preferred embodiment. However, in a given case, the scope of the right to exclude may be limited by a narrow disclosure." *Id.* Each case turns on its own facts. *In re Smythe, supra*. A review of the Specification as a whole is required to reveal whether the Specification reasonably conveys that Appellants invented a process as broad as now claimed.

Upon a reading of the Specification as a whole, what naturally occurs to the reader is that the inventors have further improved upon a very specific prior art semiconductor device containing a capacitor plate composed of polysilicon (poly-Si) doped with phosphorus or arsenic. The invention is described as an improvement over the prior art devices of Figures 4 and 5. Those prior art devices are fabricated by forming a plate 8 “typically formed of poly-Si doped with phosphorus P or arsenic As” and oxidizing the surface of the plate 8 “to form a first interlayer oxide film 13.” (Specification, page 6). The plate electrode 8 within the groove, as shown in Figure 6, is also described on page 9 as being formed of poly-Si. Then the Specification, in disclosing the invention, specifically sets forth a process of depositing poly-Si into a groove, doping with phosphorus or arsenic to form the capacitor plate 8, and then oxidizing the doped poly-Si to form silicon dioxide on the surface. The groove is then filled with more poly-Si and etched to embed the poly-Si in the groove and remove excess poly-Si to provide a planar surface for the deposition of further layers (Specification, page 19, line 22 to page 20, line 14; Fig. 19).

At no point does the Specification indicate using materials other than poly-Si for the plate 8 and filling layer 82. The etch stop layer is specifically disclosed as formed by thermal oxidation of the poly-Si of the capacitor plate to form a layer of silicon dioxide. No other materials or processes are disclosed for forming the etch stop.

We agree with Appellants that the advantage of using a silicon dioxide film on the poly-Si film 8 in order to protect the film 8 during etching of the second poly-Si film is clearly disclosed in the

Specification (Brief, page 14). However, this disclosed advantage does not reasonably convey that Appellants were in possession of the broader concept of using any insulating film on a conducting film and forming a second film of any composition over the insulating film. The conclusion does not follow because the protective function of silicon dioxide film does not flow from the insulating property of the silicon dioxide but from the fact that silicon dioxide is more than ten times harder than poly-Si (Specification, page 21). For the purpose of protecting the underlying poly-Si layer, the insulating property is of little consequence. It is the hardness property which prevents etching through to the underlying poly-Si layer.

Appellants argue that their “description of specific materials, together with a description of the function of these materials in the processing, would convey to one skilled in the art the knowledge that appellants invented a method of fabricating a semiconductor device ... as claimed.” (Reply Brief, pages 2 and 3). However, the description of materials is limited to poly-Si and silicon dioxide. Appellants cite no language in the Specification which indicates that other materials were contemplated. In addition, as explained above, the description of the function of the materials does not convey that Appellants were in possession of the concept of substituting other conductive materials for the poly-Si and other insulating materials for the silicon dioxide.

Appellants look to Figure 19 and pages 18 to 21, particularly, page 19, line 22 to page 21, line 6 in combination with Figure 19 of the original disclosure for support of the broader claim language. This is the same portion of the Specification describing the polysilicon and silicon dioxide process which

the Examiner argues limits Appellants' permissible claim scope. Appellants also argue that the use of the phraseology "an aspect of the present invention" at page 8, lines 4-10 and page 12, lines 6-12 also indicates that a more generic invention was being conveyed (Brief, pages 13-14 and 21). Furthermore, Appellants also argue that the disclosure describes various embodiments including forming isolation grooves as shown in Figure 13 at 25 (Brief, page 21). Appellants conclude that, taking the original disclosure as a whole, the description is not so limiting as alleged by the Examiner (Brief, page 21). However, upon our review of the facts, we do not find that the disclosure describes embodiments broad enough to encompass the present claims. We note that the "other embodiments" referred to by Appellants are not described as involving the claimed step of etching a second film so as to embed the second film in the groove. The only embodiments meeting that claim limitation are specifically disclosed as using poly-Si as the first layer and thermally oxidizing to form a silicon dioxide etch stop layer.

Appellants argue that depositing various conductive films, such as aluminum, on semiconductors to make memory cells and using various insulating films in semiconductive devices was well known as of the effective filing date. Appellants submit that one of ordinary skill in the art, reading the disclosure of pages 19-21 of the Specification describing how to provide a flat surface over a filled groove, especially in combination with Fig. 19, would have known that the present invention is as broad as that presently claimed. (Brief, pages 15 and 17; Reply Brief, page 3). Appellants are applying the wrong test. The test is not whether one of ordinary skill in the art would find the invention obvious after reading the disclosure, it is whether the disclosure itself conveys that Appellants had possession of the

later-claimed subject matter. A disclosure that merely renders the later-claimed subject matter obvious is not sufficient to meet the written description requirement; the disclosure must describe the claimed invention with all its limitations. *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1158, 47 USPQ2d 1829, 1832 (Fed. Cir. 1998); *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). “That a person skilled in the art might realize from reading the disclosure that such a step is *possible* is not a sufficient indication to that person that the step is part of appellants’ invention.” *In re Barker*, 559 F.2d 588, 593, 194 USPQ 470, 474 (CCPA 1977), *cert. denied*, 434 U.S. 1064 (1978)(quoting *In re Winkhaus*, 527 F.2d 637, 640, 188 USPQ 129, 131 (CCPA 1975)).

For the above reasons, we conclude that the disclosure, as originally filed, would not reasonably convey to an artisan that the Appellants had possession, as of the filing date, of the subject matter of the claims presently on appeal.

CONCLUSION

To summarize, the decision of the Examiner to reject claims 30-32, 35, 41-43, 66, 67, and 74 under 35 U.S.C. § 112, first paragraph, as lacking written description is affirmed.

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APPEAL NO. 1997-1808 - JUDGE TIMM
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APJ TIMM

APJ KRATZ

APJ SMITH

DECISION: AFFIRMED

Prepared By: Tina

DRAFT TYPED: 26 Apr 02

FINAL TYPED: