UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KOUICHI NAGAI,
and HIDEYUKI KANEMITSU

Appeal 2008-3497
Application 10/360,875
Technology Center 1700

Decided: September 18, 2008

Before EDWARD C. KIMLIN, THOMAS A. WALTZ, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

KIMLIN*, Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 and 3-19. Claims 20-23 have been withdrawn from consideration. Claim 1 is illustrative:

1. The method of manufacturing a semiconductor device, comprising the steps of:

forming one or more insulation films over a substrate, said one or more insulation films including an insulation film at a top thereof;

coating the insulation film with a substrate processing agent;

providing resist onto the insulation film coated with the substrate processing agent;

lithographically forming a pattern of the resist; and

dry-etching the insulation film by using the resist as a mask,

wherein the substrate processing agent contains at least a solvent and an acid generating agent,

wherein the solvent ranges between 90% to 99.99% of the substrate processing agent,

wherein the acid generating agent ranges between 0.01% to 10% of the substrate processing agent.

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

Shiraishi	5,350,485	Sep. 27, 1994
Nunomura	6,329,110 B1	Dec. 11, 2001

Appellants' claimed invention is directed to a method of making a semiconductor device comprising forming at least one insulation film over a substrate and coating the insulation film with a substrate processing agent which contains a solvent and an acid generating agent. A pattern of a resist is lithographically formed on the coating comprising the processing agent and the insulation film is dry-etched by using the resist as a mask.

Appealed claims 1 and 3-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shiraishi in view of Nunomura.

Appellants provide separate arguments for only claims 6, 7, and 10. Accordingly, claims 3-5, 8, 9, and 11-19 stand or fall together.

We have thoroughly reviewed each of the respective positions advanced by the Appellants and the Examiner. In so doing, we find ourselves in agreement with the Examiner that the subject matter of claims 1, 3-5, 8, 9, and 11-19 would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. However, we agree with Appellants that the Examiner's rejection of claims 6, 7, and 10 is not sustainable.

We consider first the Examiner's rejection of claim 1. The Examiner has properly found that Shiraishi, like Appellants, discloses a method of making a semiconductor device comprising the steps of forming an insulation film over a substrate, coating the insulation film with a substrate processing agent comprising an acid generating agent (Shiraishi's catalyst generation layer), and lithographically etching a pattern in the insulation film by using a resist mask. *See* Shiraishi at column 2, lines 55 et seq. Shiraishi also discloses that the substrate processing agent (catalyst generation layer) comprises 5 wt. % solid concentration and, ergo, 95% solvent (xylene) (*see* col. 6, ll. 14-20). Accordingly, based on the Shiraishi disclosure, we find no error in the Examiner's legal conclusion that it would have been obvious for one or ordinary skill in the art to make a semiconductor device comprising the steps recited in claim 1 on appeal. Nunomura provides additional evidence that it was known in the art to use a solvent for facilitating the coating of an organic film.

Appellants submit that the catalyst generation layer of Shiraishi is an insulation film and the "*Shiraishi* does not disclose a substrate processing

agent coated on the catalyst generation layer so that the substrate processing agent is at the interface of the catalyst generation layer and the resist" (Principal Br. 11, third para.). However, although the catalyst generation layer of Shiraishi may be an insulation film, it also meets the requirements of the presently claimed substrate processing agent comprising a solid and an acid generating agent. Shiraishi clearly discloses an insulator layer that is separate and distinct from the catalyst generation layer (*see* col. 2, ll. 59-60).

Appellants rely upon the Specification disclosure to support the argument that "the claimed ranges for the solvent and the acid generating agent in the substrate processing agent provides unexpected results beyond mere coatability, such as preventing pattern collapse and resist separation and also preventing the removal of a protective group of the resist" (Reply Br. 9, last para.). However, Appellants have not demonstrated that the Specification results would be considered truly unexpected by one of ordinary skill in the art. *In re Merck & Co.*, 800 F.2d 1091, 1099 (Fed Cir. 1986). Moreover, inasmuch as Shiraishi clearly teaches the use of a solvent in the catalyst generation layer in an amount within the claimed range, Appellants have simply demonstrated, at best, that the use of such a solvent provides additional advantages over those recognized by the prior art. These additional advantages do not, in our opinion, outweigh the obviousness of utilizing the claimed amount of solvent in the catalyst generation layer of Shiraishi.

The Examiner's rejection of claims 6, 7, and 10 is another matter. Appealed claim 10 requires that the insulation film has an acid generating agent therein. However, Shiraishi fails to teach that the insulator film comprises such an acid generating agent. Although the Examiner states that

the limitations of claim 10 "have been addressed above" (page 4 of Answer, last para.), we find no such discussion in the Answer. Since Shiraishi does not teach that the insulator film comprises an acid generating agent, the reference also fails to teach that the acid generating agent in the catalyst generation layer generates an acid with an acid strength weaker than the acid supplied by the insulator film, as required by claims 6 and 7. Manifestly, the absence of an acid in Shiraishi's insulator layer negates any teaching or suggestion of providing acids of different strength in the catalyst generation layer and insulator layer.

In conclusion, based on the foregoing, the Examiner's § 103 rejection of claims 1, 3-5, 8, 9, and 11-19 is sustained. The Examiner's rejection of claims 6, 7, and 10 is reversed. Accordingly, the Examiner's decision rejecting the appealed claims is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(effective Sept. 13, 2004).

AFFIRMED-IN-ART

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