

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* UNSOON KIM, YU SUN, HIROYUKI KINOSHITA,  
KUO-TUNG CHANG, HARPREET K. SACHAR,  
and MARK S. CHANG

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Appeal 2008-1989  
Application 10/277,395  
Technology Center 2800

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Decided: June 30, 2008

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Before THOMAS A. WALTZ, CATHERINE Q. TIMM, and  
ROMULO H. DELMENDO, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claim 1 (Final Office Action entered Mar. 23, 2005). The other pending claims have either been indicated as reciting allowable subject matter

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(claims 2-8) or withdrawn from further consideration (claims 9-14). We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

Appellants invented a method for performing shallow trench isolation during semiconductor fabrication that improves trench corner rounding. (Specification, hereinafter “Spec.,” 3, ll. 8-9).

Claim 1 reads as follows:

1. A method for performing shallow trench isolation during semiconductor fabrication that improves trench corner rounding, the method comprising the steps of:

(a) etching trenches into a silicon substrate between active regions;

(b) performing a double liner oxidation process on the trenches; and

(c) performing a double sacrificial oxidation process on the active regions, wherein corners of the trenches are rounded in each of the four oxidation processes.

The prior art relied upon by the Examiner in rejecting the claim on appeal is:

Wu                            6,165,854                            Dec. 26, 2000

The Examiner rejected claim 1 under 35 U.S.C. § 102(b) as anticipated by Wu (Examiner’s Answer entered Jun. 12, 2007, hereinafter “Ans.,” 3).

## ISSUE

Have Appellants demonstrated reversible error in the Examiner’s factual finding that claim 1 is anticipated by Wu?

## FINDINGS OF FACT

1. The Examiner relied on a dictionary definition to establish that “sacrificial” means “of, relating to, of the nature of, or involving sacrifice” and that “sacrifice” means “destruction or surrender of something for the sake of something else” (Ans. 5).
2. The sole embodiment disclosed in Appellants’ Specification shows that the sacrificial oxide layers 44 and 46 are sacrificed, i.e., completely removed in favor of some other material (Spec. 8, ll. 1-21; Figures 3K-3N).
3. Wu describes a method to fabricate shallow trenches for isolation comprising, inter alia, etching trenches 8, forming a thermal oxide film 10, forming a silicon oxynitride film 12, forming a thick CVD oxide layer 14 (portions of which are subsequently stripped), and forming sacrificial oxide layer 16 (which is subsequently etched back) (col. 3, l. 27 to col. 4, l. 67; Figures 1-9).

## PRINCIPLES OF LAW

“To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.” *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997). “Anticipation is an issue of fact . . . and the question whether a claim limitation is inherent in a prior

art reference is a factual issue on which evidence may be introduced...” *Id.* (internal citations omitted).

## ANALYSIS

The Examiner asserts that each and every limitation of claim 1 is described in Wu’s Figures 3, 5, and 8 (Ans. 3). Appellants, on the other hand, argue that “Wu does not disclose ‘performing a double sacrificial oxidation process on the active regions, wherein corners of the trenches are rounded in each of the four oxidation processes’ as recited in claim 1” (Appeal Brief filed Jun. 3, 2005, hereinafter “Br.,” 3). Specifically, Appellants urge that the Examiner did not provide any basis in fact and/or technical reasoning to support the assertion that Wu’s CVD oxide layer 14 is a sacrificial oxide layer (Br. 3-4). Furthermore, Appellants contend that the Examiner did not provide any evidence that Wu’s layers 10, 12, 14, and 16 are all used to round the corners of the trenches as required by claim 1 (Br. 5).

We must agree with Appellants that the Examiner failed to establish a *prima facie* case of anticipation. The sole embodiment disclosed in Appellants’ Specification shows that the sacrificial oxide layers are sacrificed, i.e., completely removed in favor of some other material (Fact 2). Appellants’ use of the term “sacrificial” in this manner is entirely consistent with the ordinary meaning of the term, which the Examiner established as involving “destruction or surrender of something for the sake of something else” (Fact 1). Accordingly, one skilled in the relevant art would have understood the term “double sacrificial oxidation process” in claim 1 to involve complete removal of two oxidation layers.

Wu, by contrast, has not been shown to disclose this. While the Examiner has taken the position that Wu's CVD oxide layer 14 is a sacrificial oxide layer (Ans. 5), Wu's CVD oxide layer 14 is not completely removed in favor of another material, i.e., sacrificed (Fact 3). Indeed, Wu explicitly discloses layer 16 as a "sacrificial oxide layer" but chose not to do the same for layer 14 (Fact 3). Under these circumstances, the Examiner did not demonstrate that Wu describes, either explicitly or inherently, a "double sacrificial oxidation process" as recited in claim 1.

The Examiner's rejection fails for an additional reason. The Examiner argues that Wu's "layer 12 is conformal and the trench corners are still rounded and anticipate the Appellant's claim limitation 'wherein corners of the trenches are rounded in each of the four oxidation processes'" (Ans. 7). The Examiner's argument, however, is merely conclusory and lacks factual foundation.

## CONCLUSION

On this record, we determine that Appellants have shown that the Examiner reversibly erred in finding that claim 1 is anticipated by Wu.

## DECISION

The Examiner's decision to reject appealed claim 1 is reversed.

REVERSED

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