

UNITED STATES DISTRICT COURT  
DISTRICT OF NEW MEXICO

STC.UNM,

Plaintiff,

v.

INTEL CORPORATION,

Defendant.

Case No. 10-CV-01077-RB-WDS

**SUPPLEMENTAL DECLARATION OF  
DR. BRUCE SMITH IN SUPPORT OF  
INTEL'S RESPONSE BRIEF ON CLAIM  
CONSTRUCTION**

1. I, Bruce Smith, declare as follows:

2. I have personal knowledge of the facts set forth herein and if called to testify as a witness thereto could do so competently under oath. Attached hereto as Ex. A is a copy of my curriculum vitae.

3. In photolithography, the physical three-dimensional pattern in the photoresist is not created until after the photoresist is both exposed and developed. When photoresist is exposed to a pattern of light, the photosensitive material reacts—depending upon the saturation or intensity of light absorbed at each location—but no physical, three-dimensional pattern forms in the photoresist until after development, when some resist is selectively removed.

4. I note that an essential element of Dr. Mack's logic turns on his assumption that the white rectangles of Figure 1 of the '998 patent represent upward-projecting "posts" or "pillars" rather than "holes" (openings), *and* that therefore all white or clear portions of all figures in the patent represent posts rather than holes. Dr. Mack's assumption about the depiction of holes versus posts is both unorthodox and contradicted by the patent and its prosecution history. It also leads him to conclude, incorrectly, that the words of claim 6 must be ignored in order to conform the claim to some of the figures.

5. When drawing visual representations of holes, openings, or spaces in photolithographic patterns (areas that do not cover the layer below), the convention in the art is

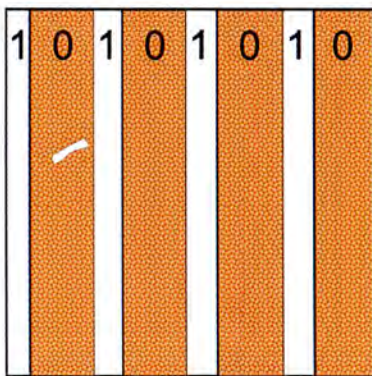
to indicate such holes as clear or white space. Opaque, colored, or speckled portions of a drawing typically represent posts, pillars, or line regions (areas that do cover the layer below). This is the convention used in Figures 9A–9E and Figures 10A–10F of the '998 patent. In the Figure 9 series, items labeled 48 and 50 are white, and represent areas that have been etched away. In the Figure 10 series, the same is true of items 68 and 70. The prosecution history also confirms that the round and square white spaces in Figures 6A and 6B represent holes rather than posts or pillars. [See Ferrall Declaration Exhibit 2 (January 14, 1999 Amendment) at 9 (“Figures 6 and 7 exemplify this result by the demonstration of the round hole to square hole transition.”)] Dr. Mack follows the same convention of using clear or white space to depict holes, rather than posts or pillars, in his own textbook. Attached hereto as Exhibit B are excerpts from C. Mack, *Fundamental Principles of Optical Lithography* (2007); see pages 7, 86 & 358.

6. Dr. Mack’s conclusion that Figure 1, and by extension all figures in the '998 patent, depict posts or pillars of photoresist as white space appears to be based on a phrase that refers to the rectangles in Figure 1 as “staggered bars.” [See '998 col. 6:60] But the description of a pattern as “staggered bars” in no way implies whether they are holes in a layer or posts on a layer. A bar can be either a hole or a post. In fact, Dr. Mack shows both representations in his own textbook. [See Exhibit B at 7 & 427] Furthermore, the patent makes clear that Figure 1 is not a pattern in photoresist, but rather a modeled pattern—an idealized goal as opposed to a depiction of a physical structure. The patent also clarifies that the patent is “not intended to restrict its applicability to only this [Figure 1] or substantially similar patterns.” [’998 col. 7:1-2] I do not see anything in the patent that suggests that “white” or clear regions necessarily correspond to a post, contrary to the conventional use of white to depict a hole.

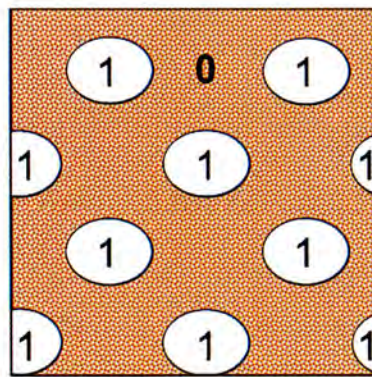
7. Dr. Mack is also incorrect in arguing that pattern multiplication cannot be performed when making rectangular holes such as the holes depicted in Figure 7. The patent describes pattern “multiplication” as the product of two patterns. STC itself acknowledges (at 22 of its brief) that the making of “rectangular hole[s]” as in Figure 7B results in “multiplication” of the individual images. Figure 7B clearly shows square “holes” in between the intersecting lines. The patent states that “Fig. 7B shows an exemplary resulting pattern: the vertical lines are in the

nitride, the horizontal lines are in the second photoresist layer. Together the two mask patterns provide a **multiplication** of the individual images.” [’998 col. 13:23-30) (emphasis added)]

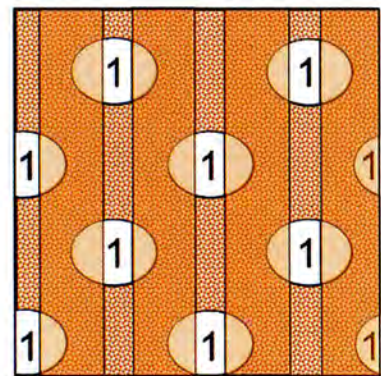
8. Following the standard convention that white areas depict holes, Figures 8A–8C could represent the multiplication of two patterns as well. Multiplication can be confirmed by assigning a value 1 to each of the white or clear openings in Figure 8A and the value 0 to the speckled areas in between, and doing likewise in Figure 8B. Overlaying the patterns on top of each other and multiplying each corresponding section results in Figure 8C, where only areas with openings on both layers result in a white area in 8C ( $1 \times 1 = 1$ ). Such an overlay and multiplication is depicted below:



First Pattern



Second Pattern



Pattern  
Multiplication  
 $1 \times 1 = 1$ ,  $0 \times 1 = 0$ ,  
 $1 \times 0 = 0$ ,  $0 \times 0 = 0$

9. In the ‘998 Patent, just as pattern multiplication is the product of two patterns, pattern “addition” refers to the sum of two patterns. Take Figures 10A – 10F, for example. The two lines etched into the hard mask depicted in one layer of photoresist (item 68 in Figure 10C)

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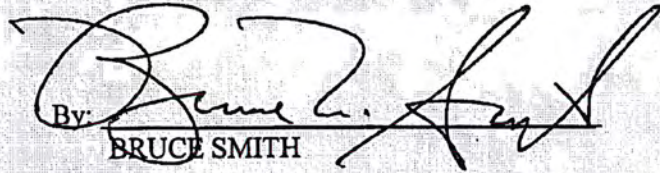
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are added to the lines created in the second photoresist (item 70 in Figure 10E), resulting in the five holes depicted in Figure 10F.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Dated: July 22, 2011, at Rochester, NY.

By:   
BRUCE SMITH