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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: WET DEVELOPABLE HARD MASK IN CONJUNCTION WITH THIN PHOTORESIST FOR MICRO PHOTOLITHOGRAPHY

(57) Abstract: A novel process for using a hard mask or protective layer in conjunction with an extremely thin photoresist is provided. In this process, a thin film of the protective layer is coated on the surface of a substrate that is to be selectively modified by reactive ion etch (RIE). The protective layer is photosensitive and anti-reflective. An extremely thin photoresist layer is coated on top of the protective layer. The stack of the films is selectively exposed to actinic radiation at a wavelength determined by the sensitivities of the protective layer and photoresist layer. The latent images on the photoresist and protective layers resulting from the exposure are developed with a common alkaline developer. The three dimensional patterns of photoresist and underlying protective layer are formed simultaneously by the single exposure and single development. When the underlying substrate is etched by RIE, the protective layer is the masking layer, not the photoresist.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/18851

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G03F 7/00, 7/30

US CL : 430/312, 330

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 430/312, 330

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 6,136,679 (YU et al.) 24 October 2000 (24.10.2000), column 4, line 18- column 5, line 54.	1-3, 7, 14, 17-20, 24, 27 -----
Y, E	US 6,844,131 B2 (OBERLANDER et al.) 18 January 2005 (18.01.2005), column 5, lines 9-67, column 12, lines 1-21, column 13, lines 8-32.	4, 6, 9-13, 15, 21, 23, 1, 5-14, 17, 18, 22-24, 27
Y, P	US 6,740,469 B2 (KRISHNAMURTHY et al.) 25 May 2004 (25.05.2004), column 2, lines 1-15, column 4, lines 10-52.	1, 4, 6, 7, 9-11, 13, 15, 16, 18, 21, 23, 26, 27

Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search

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Continuation of B. FIELDS SEARCHED Item 3:

EAST search

search terms: photoresist, protective, hard mask, antireflective