



US005879577A

United States Patent [19]

[11] **Patent Number:** **5,879,577**

Weng et al.

[45] **Date of Patent:** **Mar. 9, 1999**

[54] **PROCESS FOR WAFER PERIPHERAL EDGE DEFECT REDUCTION** 5,783,097 7/1998 Lo et al. 216/41

OTHER PUBLICATIONS

[75] Inventors: **Kuo-Yao Weng**, Taoyuan Hsien;
Yeh-Jye Wann, Hsin-Chu, both of
Taiwan

“Novel edge bead process—by channeling UV light through cable to expose resist at edge of spinning wafer after post-exposure baking before development” Research Disclosure #331,028, Nov. 1991.

[73] Assignee: **Taiwan Semiconductor Manufacturing Company Ltd.**,
Hsin-Chu, Taiwan

Primary Examiner—R. Bruce Breneman
Assistant Examiner—Anita Alanko
Attorney, Agent, or Firm—George O. Saile; Stephen B. Ackerman

[21] Appl. No.: **782,710**

[22] Filed: **Jan. 13, 1997**

[57] ABSTRACT

[30] Foreign Application Priority Data

Dec. 13, 1996 [TW] Taiwan 85115451

A method is described for selectively etching photoresist on a semiconductor substrate having one or more layers of a spin on glass, including an edge bead that was formed when the glass was originally applied. First the wafer is coated with a layer of unexposed, undeveloped negative photoresist. Then, while spinning the wafer, a vertical jet of photoresist EBR solvent is directed to a point just inside the edge so that photoresist gets removed from an annular area extending inwards from the perimeter. The edge bead is then removed using a liquid etchant and integrated circuit processing can now proceed, making use of the unexposed, undeveloped layer of photoresist in the usual way; that is, exposing it through a mask and then developing and baking it before using it as an etch mask. The method is general and may be used in other situations where selective removal of photoresist along the periphery is required and where the remaining resist is to be used for other purposes.

[51] **Int. Cl.⁶** **H01L 21/302**

[52] **U.S. Cl.** **216/92; 216/49; 216/95;**
216/97; 438/748

[58] **Field of Search** 216/49, 92, 95,
216/97; 438/748, 750

[56] References Cited

U.S. PATENT DOCUMENTS

4,510,176	4/1985	Cuthbert et al.	427/82
4,732,785	3/1988	Brewer	427/240
5,168,021	12/1992	Arai et al.	430/22
5,328,871	7/1994	Tanigawa et al.	437/231
5,425,846	6/1995	Koze et al.	156/646
5,609,995	3/1997	Akram et al.	430/327
5,773,083	6/1998	Fischer et al.	427/240
5,779,928	7/1998	Yamashita et al.	216/92

13 Claims, 3 Drawing Sheets

