



US005238878A

United States Patent [19]

[11] Patent Number: **5,238,878**

Shinohara

[45] Date of Patent: **Aug. 24, 1993**

[54] **FILM FORMING METHOD BY SPIN COATING IN PRODUCTION OF SEMICONDUCTOR DEVICE**

61-184824 8/1986 Japan 437/231
3-145715 6/1991 Japan 437/231

[75] Inventor: Masahide Shinohara, Tokyo, Japan

OTHER PUBLICATIONS

Decker, S. K., et al., "Spin Coating Edge Build-Up Elimination" *IBM Tech. Disc. Bull.*, vol. 20, No. 10, Mar. 1978, pp. 4082-4083.

[73] Assignee: NEC Corporation, Tokyo, Japan

Primary Examiner—T. N. Quach

[21] Appl. No.: 19,056

[22] Filed: Feb. 18, 1993

[57] ABSTRACT

[30] Foreign Application Priority Data

Feb. 18, 1992 [JP] Japan 4-29842

Upon the formation of a film on a semiconductor substrate by spin coating method, a polyimide precursor solution as a film forming solution is supplied dropwise onto the semiconductor substrate, and then the semiconductor substrate is started to be rotated at a low revolving speed of 1,000 rpm while pure water as an adhesion protecting liquid is injected upon the backside of the semiconductor substrate. By this operation, the polyimide precursor solution is spread out over the above surface of the semiconductor substrate by the rotation thereof. On the other hand, pure water is injected on the backside of the substrate before the dropped solution reaches the periphery of the substrate. As a result, the polyimide precursor liquid is prevented from going around to the backside of the substrate by the injection of pure water, thus protecting the adhesion of the polyimide precursor solution onto the backside of the substrate.

[51] Int. Cl.⁵ H01L 21/469

[52] U.S. Cl. 437/231; 148/DIG. 17; 134/33; 427/240

[58] Field of Search 437/231, 10, 225, 229; 134/33; 148/DIG. 17, DIG. 75; 427/240

[56] References Cited

U.S. PATENT DOCUMENTS

- 4,113,492 9/1978 Sato et al. 427/240
- 4,510,176 4/1985 Cuthbert et al. 427/82
- 4,518,678 5/1985 Allen 430/311
- 5,001,084 3/1991 Kawai et al. 437/231
- 5,127,362 7/1992 Iwatsu et al. 118/667
- 5,159,374 10/1992 Groshong 354/317

FOREIGN PATENT DOCUMENTS

- 55-12750 1/1980 Japan 427/240
- 55-103728 8/1980 Japan 437/231

10 Claims, 4 Drawing Sheets

