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[54] **DEPOSITION OF AN INTER LAYER DIELECTRIC FORMED ON SEMICONDUCTOR WAFER BY SUB ATMOSPHERIC CVD**

5,691,573 11/1997 Avanzino et al. 257/758

FOREIGN PATENT DOCUMENTS

58-93354 6/1983 Japan 204/192.37
63-131546 6/1988 Japan 148/DIG. 158

OTHER PUBLICATIONS

Kotani, H., et al., "Sputter Etching Planarization for Multi-level Metallization", J. Electrochem. Soc.: Solid State Science & Tech. Mar. 1983, pp. 645-648.

Vossen, J., et al., "Back Scattering of Material Emitted from RF-Sputtering Targets", RCA Review, Jun. 1970, pp. 293-305.

Valletta R.M., "Control of Edge Profile in Sputter Etching", IBM Tech. Disc. Bull. vol. 10, No. 12, May. 1968, p. 1974.

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[51] Int. Cl.⁶ **H01L 23/48**

[52] U.S. Cl. **257/758; 257/752**

[58] Field of Search 257/758

[56] References Cited

U.S. PATENT DOCUMENTS

| | | | |
|-----------|---------|-----------------------|------------|
| 3,617,463 | 11/1971 | Gregor et al. | 204/298.31 |
| 4,702,795 | 10/1987 | Douglas | 437/225 |
| 4,797,375 | 1/1989 | Brownell | 437/187 |
| 4,872,947 | 10/1989 | Wang et al. | 204/192.37 |
| 4,952,274 | 8/1990 | Abraham | 204/192.37 |
| 4,983,540 | 1/1991 | Yamaguchi et al. | 437/930 |
| 5,270,264 | 12/1993 | Andideh et al. | 437/228 |
| 5,514,624 | 5/1996 | Morozumi | 437/195 |
| 5,563,104 | 10/1996 | Jang et al. | 437/235 |
| 5,679,606 | 10/1997 | Wang et al. | 437/195 |

[57] ABSTRACT

A method of depositing an inter layer dielectric. A first layer using plasma enhanced chemical vapor deposition (CVD) is deposited. It is followed by a second layer, deposited using sub atmospheric CVD. The second layer is argon sputter etched.

19 Claims, 8 Drawing Sheets

