METHOD OF FORMING COATING FILM AND APPARATUS THEREFOR

Inventors: Keizo Hasebe, Kofu; Akihiro Fujimoto, Kumamoto-ken; Hiroichi Inada, Kumamoto; Hiroyuki Ino, Nirasaki; Shizzi Kitamura, Kumamoto-ken; Masatoshi Deguchi, Kumamoto; Mitsuhiro Nambu, Kumamoto-ken, all of Japan

Assignees: Tokyo Electron Limited, Tokyo; Tokyo Electron Kyushu Limited, Tosu, both of Japan

Appl. No.: 09/287,193
Filed: Apr. 6, 1999

Related U.S. Application Data

Division of application No. 08/686,910, Jul. 26, 1996, Pat. No. 5,942,035, which is a division of application No. 08/217,636, Mar. 25, 1994, Pat. No. 5,658,615.

Foreign Application Priority Data

May 10, 1993 [JP] Japan ....................... 5-132594
Dec. 27, 1993 [JP] Japan ....................... 5-348812

Int. Cl. B05C 5/00

U.S. Cl. 118/52; 118/313; 118/319; 118/320; 118/321; 118/323

Field of Search 118/313, 319, 118/320, 321, 323, 52; 427/425, 426, 240; 134/902

References Cited

U.S. PATENT DOCUMENTS

4,564,280 1/1986 Fukuda ......................... 118/321
5,002,008 3/1991 Ushijima et al. .............. 118/313
5,066,616 11/1991 Gordon .....................
5,089,305 2/1992 Ushijima et al. .............. 118/321
5,374,312 1/1995 Hasibe et al. ................ 118/52
5,403,397 4/1995 Beckers et al. ............... 118/52

FOREIGN PATENT DOCUMENTS

2,458,363 2/1981 France ..................
28,09,286 9/1979 Germany ...........
58,82521 5/1983 Japan ..............
61,150,332 9/1986 Japan ...........
62,86719 4/1987 Japan ...........
63,301,520 12/1988 Japan ...........

Primary Examiner—Laura Edwards
Attorney, Agent, or Firm—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

ABSTRACT

An apparatus for forming a coating film, comprises a spin chuck for supporting a substrate with one surface facing upward and rotating the substrate about a vertical axis, a first nozzle for supplying a solvent of a coating solution on the substrate, and a second nozzle for supplying the coating solution on a central portion of the substrate. The first and second nozzles are supported by a head such that the supported nozzle moves between a dropping position above the substrate and a waiting position offset from the substrate. The solvent and coating solution are diffused along the surface of the substrate by rotating the spin chuck.

7 Claims, 17 Drawing Sheets