

# United States Patent [19]

## Shiraishi et al.

#### 5,939,130 **Patent Number:** [11]

#### **Date of Patent:** Aug. 17, 1999 [45]

### **COATING FILM FORMING METHOD AND COATING FILM FORMING APPARATUS**

[75] Inventors: Masatoshi Shiraishi, Kikuchi; Yukio Kiba, Kumamoto-ken; Kunie Ogata,

Yokohama, all of Japan

[73] Assignee: Tokyo Electron Limited, Tokyo, Japan

Appl. No.: 08/863,427 [21]

May 27, 1997 [22] Filed:

[30] Foreign Application Priority Data

[51] Int Cl 6		R05D 3/1

**U.S. Cl.** ...... 427/9: 427/8: 427/10: [52]

427/240; 427/385.5; 118/52; 118/665; 118/666; 118/667; 118/712; 437/231

[58] **Field of Search** ...... 427/240, 9, 10, 427/8, 385.5; 118/52, 665, 666, 667, 712;

437/231

#### [56] References Cited

### U.S. PATENT DOCUMENTS

### FOREIGN PATENT DOCUMENTS

0 595 749 5/1994 European Pat. Off. . 2-39520 2/1990 Japan .

7-97548 10/1995 Japan .

### OTHER PUBLICATIONS

Patent Abstracts of Japan, vol. 8, No. 285 (E-287), Dec. 26, 1984, JP 59-151424, Aug. 29, 1984.

Patent Abstracts of Japan, vol. 017, No. 262 (P-1541), May 24, 1993, JP 05-002777, Jan. 8, 1993.

Patent Abstracts of Japan, vol. 015, No. 423 (E-1127), Oct. 28, 1991, JP 03-178123, Aug. 2, 1991.

T. E. Metz, et al., Semiconductor International, vol. 15, No. 2, pp. 68 and 69, "In Situ Control of Photoresist Coating Processes", Feb. 1992.

Primary Examiner—Janyce Bell

Attorney, Agent, or Firm-Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

#### **ABSTRACT** [57]

A coating film forming method for forming a resist coating film on an upper surface of a wafer held by a spin chuck in a chamber includes (a) the step of keeping preliminary correlation data representing correlation between a wafer rotating speed and the thickness of the resist coating film formed on the wafer in the chamber, (b) the step of conveying the wafer into the chamber and holding the wafer by the spin chuck, (c) the step of pouring the resist liquid onto the wafer and spin-rotating the wafer to form a resist coating film on the upper surface of the wafer, (d) the step of detecting the thickness of the formed resist coating film by a sensor, (e) the step of detecting a rotating speed of the spin chuck by a sensor, and (f) the step of, on the basis of the detected film thickness and the preliminary correlation data, correcting a set rotating speed of the spin chuck to feedbackcontrol a resist coating process for a next wafer.

# 23 Claims, 7 Drawing Sheets

