(12) **United States Patent**
Mihara

(10) **Patent No.: US 6,287,986 B1**
(45) **Date of Patent: Sep. 11, 2001**

(54) **SPUTTERING FILM FORMING METHOD, SPUTTERING FILM FORMING EQUIPMENT, AND SEMICONDUCTOR DEVICE MANUFACTURING METHOD**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/244,761**

(22) Filed: **Feb. 5, 1999**

(30) **Foreign Application Priority Data**

Jun. 2, 1998 (JP) 10-152749

(51) **Int. Cl.**[7] **H01L 21/4763**; H01L 21/31; H01L 21/469

(52) **U.S. Cl.** **438/763**; 438/649; 438/758

(58) **Field of Search** 438/649, 763, 438/758, 475, 454

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(57) **ABSTRACT**

There is provided an RF sputtering film forming method of forming a compound film having a stable composition by use of stable plasma with a broad process window to thus facilitate composition control of the compound film. In the RF sputtering film forming method, an alternating voltage or alternating current is applied to a part or all of walls positioned on the outside of a space formed between a wafer and a target, or an electron temperature in the plasma is reduced by oscillating the RF power in a pulse fashion, or a sputtering gas is composed of at least one kind of gases of helium, neon, xenon, and krypton, or a minus voltage is applied to a part or all of the walls positioned on the outside of the space formed between the wafer and the target.

19 Claims, 12 Drawing Sheets