Advantageous Effects of Invention

[0013]

According to the present invention, a wafer processing apparatus capable of securing prolonged stable operation of the stage and improving processing efficiency, can be provided.

Brief Description of Drawings

[0014]

Fig. 1 is a vertical sectional view schematically showing the structure of a wafer processing apparatus according to an embodiment of the present invention.

Fig. 2 is a vertical sectional view schematically showing the structure of a stage gas introduction mechanism used for an embodiment.

Fig. 3 is a transverse sectional view schematically showing the structure of a dispersing plate of a stage gas introduction mechanism according to the embodiment.

Fig. 4 is a view schematically showing a relation between a susceptor ring and slits of the dispersing plate, which constitute a gas flow passage of the stage gas introduction mechanism according to a first embodiment.

Fig. 5 is a view schematically showing a relation between a modified example of the susceptor ring and slits of the dispersing plate, which constitute the gas flow passage of the stage gas introduction mechanism according to the first embodiment.

Fig. 6 is a transverse sectional view showing a sample stand base material constituting a gas flow passage of a stage gas introduction mechanism according to a second embodiment.

the radical particles or the neutral particles of the processing gas 1013 are introduced onto the wafer 204 mounted on the mount surface of the sample stand 103 to form the reaction product layer on the surface of the processing target film layer preliminarily formed on the upper surface of the wafer 204. The step (2) for removing the reaction product layer is executed subsequent to execution of the step (1). In the step, the infrared light (electromagnetic wave) is radiated from the IR lamp unit 105 disposed above the wafer 204 to vaporize the product on the upper surface of the wafer 204 so that the reaction product layer is removed. Those steps are alternately executed with repetition to remove the processing target film on the surface of the wafer 204.

[0029]

Fig. 2 is a vertical sectional view schematically showing the structure of a stage gas introduction mechanism for an embodiment as shown in Fig. 1. The sample stand 103 as shown in the drawing is structured to be column-like shaped and coaxial with the processing chamber 104, which includes a sample stand base material 201 as an inner part, and a sample adsorption film 202 as an upper surface. The sample stand base material 201 has a ring shaped stepped portion, which surrounds an outer circumference of the surface of the sample adsorption film 202. A gas dispersing plate 208 is mounted on a bottom surface of the ring shaped stepped portion, and a susceptor ring 205 is mounted on the upper surface of the gas dispersing plate 208.

[0030]

A refrigerant flow passage 216 for cooling the sample

[0046]

In the modified example as shown in Fig. 6, vertically extending recess portions 601 are formed at respective three or more positions in the stage outer circumferential side wall 209 of the sample stand base material 201 constituting the minute gap 210 of the stage gas introduction mechanism 206 at equal intervals in the circumferential direction. Aiming at reducing unevenness in the stage gas supply to the upper surface of the sample stand base material 201, positioning is performed using the D cut 301 of the gas dispersing plate 208 and the D cut 404 of the sample stand base material 201, each of which has the same shape so that the position is fixed to the sample stand base material 201 using the screw and the bolt. The minute gap 210 between the stage outer circumferential side wall 209 of the sample stand base material 201 and the gas dispersing plate 208 is managed. The recess portions 601 formed in the stage outer circumferential side wall 209 of the sample stand base material 201 are placed at intermediate positions between the slits (introduction ports) 213 of the gas dispersing plate 208 at 16 positions for stage gas (inert gas) at equal angular intervals of 22.5°. This makes it possible to suppress the flow-rate unevenness in the circumferential direction by preventing local stagnation of the stage gas flow in spite of eccentricity of the susceptor ring 205 in the rectangular coordinate system in X and Y directions. In the second embodiment, the upper surface of the inner circumferential edge portion of the susceptor ring 205 has the D cut 403 for positioning, and the other upper surface of the inner circumferential edge portion has