are provided to at least one lower electrode and/or the at least one upper electrode.

[0023] The second RF generation part 31b is coupled to at least one lower electrode via at least one impedance matching circuit and is configured to generate a bias RF signal (bias RF power). A frequency of the bias RF signal may be the same as or different from the frequency of the source RF signal. In one exemplary embodiment, the bias RF signal has a lower frequency than the frequency of the source RF signal. In one exemplary embodiment, the bias RF signal has a frequency in a range of 100 kHz to 60 MHz. In one exemplary embodiment, the second RF generation part 31b may be configured to generate a plurality of bias RF signals having different frequencies. The generated one or more bias RF signals are provided to at least one lower electrode. Further, in various exemplary embodiments, at least one of the source RF signal and the bias RF signal may be pulsed. In a case where the RF signal (RF power) is supplied from the RF power supply 31 to the lower electrode, the RF signal (RF power) is supplied to the lower electrode via an electric wiring disposed in a cavity 11d formed in the support base 1113 and the bottom portion of the plasma processing chamber 10. The electric wiring is an example of a structure disposed in the cavity 11d.

[0024] The power supply 30 may also include a DC power supply 32 coupled to the plasma processing chamber 10. The DC power supply 32 includes a first DC generation part 32a and a second DC generation part 32b. In one exemplary embodiment, the first DC generation part 32a is connected to at least one lower electrode and is configured to generate a first DC signal. The generated first DC signal is applied to at least one lower electrode. In one exemplary embodiment, a second DC generation part 32b is

example of an upper surface of the RF plate 1112. On the upper surface of the RF plate 1112, for example, as illustrated in FIG. 6, the opening 52a corresponding to the cavity 11a, the opening 52b corresponding to the cavity 11b, the opening 52c corresponding to the cavity 11c, and the opening 52e corresponding to the cavity 11e into which the lift pin is inserted are formed. The plurality of screw holes 51b into which the screws 50b for fastening the RF plate 1112 and the support base 1113 are inserted are formed in a peripheral edge portion of the upper surface of the RF plate 1112. A plurality of screw holes 51a into which screws 50a for fastening the base 1110 and the RF plate 1112 are inserted are formed in the peripheral edge portion of the upper surface of the RF plate 1112.

[0041] A sealing layer 113a is disposed on the RF plate 1112, for example, as illustrated in FIG. 2. FIG. 7 is a view illustrating an example of the sealing layer 113a disposed on the RF plate 1112. In FIG. 7, the sealing layer 113a is hatched with oblique lines. As illustrated in FIG. 7, for example, the sealing layer 113a is a sheet-like member in which the openings 52a' to 52c' and the opening 52e' are formed in regions corresponding to the openings 52a to 52c and the opening 52e on the upper surface of the RF plate 1112. The sealing layer 113a is made of the same material as the sealing layer 113b. In the example of FIG. 7, on the upper surface of the RF plate 1112, the sealing layer 113a is disposed in a region positioned on an inner side of a region where the plurality of screw holes 51a and screw holes 51b are disposed. However, the disclosed technology is not limited thereto, and the sealing layer 113a may also be disposed in a region where the plurality of screw holes 51a and the plurality of screw holes 51b are disposed, on the upper surface of the

RF plate 1112.

[0042] As illustrated in FIG. 2, for example, the base 1110 is disposed on the RF plate 1112 and the sealing layer 113a. The base 1110 is also formed with the cavity 11a and the cavity 11b serving as the channels for allowing the heat transfer medium to flow, and the cavity 11c serving as the channel for allowing the heat transfer gas to flow. Although not illustrated in FIG. 2, the plurality of cavities 11e into which the lift pins are inserted are also formed in the base 1110.

[0043] FIG. 8 is a view illustrating an example of a lower surface of the base 1110. On the lower surface of the base 1110, for example, as illustrated in FIG. 8, the openings 52a to 52c and the opening 52e are formed at positions corresponding to the cavities 11a to 11c and the cavity 11e formed in the RF plate 1112. The plurality of screw holes 51a into which the screws 50a for fastening the base 1110 and the RF plate 1112 are inserted are formed in a peripheral edge portion of the lower surface of the base 1110. In a case where the base 1110 is placed on the RF plate 1112 on which the sealing layer 113a is disposed, the sealing layer 113a is positioned in a region R2 indicated by a broken line in FIG. 8 except for regions where the openings 52a to 52c and the opening 52e are formed.

[0044] The base 1110 and the RF plate 1112 overlap each other with the sealing layer 113a interposed therebetween, and are fastened by the plurality of screws 50a. As a result, the cavities 11a to 11c and the cavity 11e formed in the RF plate 1112 and the cavities 11a to 11c and the cavity 11e formed in the base 1110 communicate with each other via the openings 52a' to 52c' and the opening 52e' formed in the sealing layer 113a. The sealing layer 113a in which the openings 52a' to 52c' and the opening

between the RF plate 1112 and the support base 1113. When the gap between the RF plate 1112 and the support base 1113 becomes large, a gap may be generated between the RF plate 1112 or the support base 1113 and the sealing layer 113b.

[0052] Therefore, in step S10, the sheet-like sealing layer 113b formed such that a portion disposed in a region far from the fastening position is thicker than a portion disposed in a region close to the fastening position is disposed on the upper surface of the support base 1113. For example, as illustrated in FIG. 10, the sealing layer 113b having a shape in which a thickness D2 in the region far from the fastening position is larger than a thickness D1 in the region close to the fastening position is disposed on the upper surface of the support base 1113.

[0053] Then, in step S12, the RF plate 1112 and the support base 1113 are fastened by the screws 50b, so that the RF plate 1112 and the support base 1113 have a structure illustrated in FIG. 11, for example. At this time, the sealing layer 113b in a region R3 far from the fastening position has a larger amount of change in thickness due to crushing, as compared with the sealing layer 113b in a region R4 close to the fastening position. That is, a compressive force is applied to the sealing layer 113b in a direction along a direction from the support base 1113 toward the RF plate 1112, and the amount of change in thickness of the sealing layer 113b in a case where the compressive force decreases is larger at a portion closer to the center of the upper surface of the support base 1113. Therefore, in the region R3, even if the size of the gap between the RF plate 1112 and the support base 1113 increases due to the difference in expansion coefficient, the thickness of the sealing layer 113b increases following the increase in size of the gap.

As a result, even if the gap between the RF plate 1112 and the support base 1113 increases due to thermal expansion, the sealability in the region R3 far from the fastening position can be maintained.

[0054] Next, the sheet-like sealing layer 113a is disposed on the upper surface of the RF plate 1112 (S13). In step S13, the sheet-like sealing layer 113b is disposed in the region excluding the openings 52a to 52e on the upper surface of the RF plate 1112. Also in step S13, as in step S10, the sheet-like sealing layer 113a formed such that a portion disposed in a region far from the fastening position is thicker than a portion disposed in a region close to the fastening position is disposed on the upper surface of the RF plate 1112.

[0055] Next, the base 1110 is placed on the RF plate 1112 on which the sealing layer 113a is disposed (S14). Then, the RF plate 1112 and the base 1110 are fastened by the plurality of screws 50a (S15).

[0056] Next, the O-ring 111c is disposed around each of the openings corresponding to the cavities 11c and 11e on the upper surface of the base 1110 (S16). Then, the electrostatic chuck 1111 is placed on the base 1110 (S17), and the procedure of manufacturing the body part 111 shown in this flowchart ends.

[0057] A first exemplary embodiment has been described above. As described above, the member (body part 111) in the present exemplary embodiment is a member used in the semiconductor manufacturing apparatus (plasma processing apparatus 1), and includes the first member (RF plate 1112 and support base 1113), the second member (base 1110 and RF plate 1112), and the sealing layer (sealing layers 113a and 113b) disposed between the first member and the second member. The first member has a plurality of first

sealing layer 113b.

[0078] In step S20, the liquid modified silicone rubber is applied to the upper surface of the support base 1113 such that a thickness of the modified silicone rubber in a region far from the fastening position is larger than a thickness of the modified silicone rubber in a region close to the fastening position. Then, in step S21, the modified silicone rubber is cured. As a result, for example, as illustrated in FIG. 10, the sealing layer 113b having a shape in which the thickness D2 in the region far from the fastening position is larger than the thickness D1 in the region close to the fastening position is formed on the upper surface of the support base 1113.

[0079] Then, in step S12, after the RF plate 1112 and the support base 1113 are fastened by the screws 50b, the liquid modified silicone rubber as the material of the sealing layer 113a is applied to the upper surface of the RF plate 1112 (S22). In step S22, the liquid modified silicone rubber is applied to a region excluding the openings 52a to 52e on the upper surface of the RF plate 1112. In step S22, similarly to step S20, the liquid modified silicone rubber is applied to the upper surface of the RF plate 1112 such that a thickness of the modified silicone rubber in a region far from the fastening position is larger than a thickness of the modified silicone rubber in a region close to the fastening position.

[0080] Next, the modified silicone rubber applied to the upper surface of the RF plate 1112 is cured to form the sealing layer 113a on the upper surface of the RF plate 1112 (S23). In step S23, the liquid modified silicone rubber applied to the upper surface of the RF plate 1112 is cooled to about room temperature, so that the liquid silicone rubber is cured into rubber-like modified silicone

(Supplementary Note 23)

The member manufacturing method according to any one of Supplementary Notes 14 to 21, in which

at least one of the first member and the second member is controlled to a temperature of 0°C or higher, and

the sealing layer is fluororubber.