pipe 201b.

[0039] In a case where the heat medium at the first temperature is to be circulated to the main body section 111, the controller 2 controls the valve 221a and the valve 222a to be in the open state and controls the valve 223a and the valve 224a to be in the closed state. As illustrated in FIG. 3A, the heat medium at the first temperature supplied from the retaining unit 211a thereby flows through the flow path 1112a via the pipe 201a. The heat medium that has passed through the flow path 1112a and has been discharged from the flow path 1112a returns to the retaining unit 211a via the pipe 202a. The heat medium at the first temperature is circulated to the main body section 111 and temperature of the main body section 111 is thereby controlled by the heat medium flowing through the flow path 1112a.

[0040] Control for switching the heat medium to be circulated to the main body section 111 will be described next. In a case where the heat medium to be circulated to the main body section 111 is to be switched from the heat medium at the first temperature to the heat medium at the second temperature, the controller 2 controls the valve 221a and the valve 222a to be in the closed state and controls the valve 221b and the valve 222b to be in the open state. As illustrated in FIG. 3B, the heat medium at the second temperature supplied from the retaining unit 211b thereby flows through the flow path 1112b via the pipe 201b. The heat medium that has passed through the flow path 1112b and has been discharged from the flow path 1112b returns to the retaining unit 211b via the pipe 202b. The heat medium at the first temperature on the other hand stops flowing to the flow path 1112a because the valve 221a has been closed. The heat medium at the second temperature

via the pipe 201a and the pipe 202a. Furthermore, in a case where the heat medium at the first temperature is caused to flow to the flow path 1112a, the controller 2 performs control so that a heat medium is discharged from the flow path 1112b. For example, as illustrated in FIG. 5, the controller 2 controls the valve 223b to be in the open state. The purge gas supplied from the gas supply unit 216 thereby flows through the pipe 209b, the pipe 203b, the pipe 201b, the flow path 1112b, and the pipe 202b, and this flow of the purge gas causes the heat medium to return to the retaining unit 211b. The heat medium is thereby discharged from the flow path 1112b. As a result, the time taken for the temperature of the main body section 111 to stabilize is able to be shortened.

[0052] By using a control method similar to that described above, the controller 2 is able to switch the heat medium to be circulated to the main body section 111 from the heat medium at the first temperature to the heat medium at the second temperature. For example, the controller 2 controls the valve 221b to be in the open state and the valve 221a and the valve 223b to be in the closed state. Furthermore, in a case where the heat medium at the second temperature is caused to flow to the flow path 1112b, the controller 2 performs control so that a heat medium is discharged from the flow path 1112a. For example, the controller 2 controls the valve 223a to be in the open state.

[0053] FIG. 6A and FIG. 6B are diagrams illustrating an example of another configuration of the temperature control device 200 according to the embodiment. The temperature control device 200 illustrated in FIG. 6A and FIG. 6B is partly the same as the temperature control devices 200 illustrated in FIG. 2 and FIG. 5, and the same reference

controls the gas supply unit 242 to supply, for example, the purge gas to the tank 220b from the gas supply unit 242 and pressurize the interior of the tank 220b. The gas supply unit 242 may be the gas supply unit 20 or a gas supply unit provided separately from the gas supply unit 20. Pressurizing the interior of the tank 220a or 220b causes the heat medium retained in the tank 220a or 220b to be pushed by pressure in the tank 220a or 220b and flow quickly into the retaining unit 211a or 211b. In a case where the controller 2 has finished returning the heat medium retained in the tank 220a to the retaining unit 211a, the controller 2 controls the valve 225a to be in the closed state, and in a case where the controller 2 has finished returning the heat medium retained in the tank 220b to the retaining unit 211b, the controller 2 controls the valve 225b to be in the closed state.

[0061] By using a control method similar to that described above, the controller 2 is able to switch the heat medium to be circulated to the main body section 111 from the heat medium at the first temperature to the heat medium at the second temperature. For example, the controller 2 controls the valve 221b and the valve 222b to be in the open state and controls the valve 221a, the valve 223b, and the valve 225b to be in the closed state. Furthermore, in a case where the heat medium at the second temperature is caused to flow to the flow path 1112b, the controller 2 performs control so that a heat medium is discharged from the flow path 111a. For example, the controller 2 controls the valve 223a and the valve 225a to be in the open state. Furthermore, in a case where the heat medium retained in the tank 220a is to be returned to the retaining unit 211a, the controller 2 controls the valve 223a to be in the closed state and controls the valve

the above described embodiment has the supply unit 210 (heat medium supply unit), the main body section 111 (component), and the controller 2. The supply unit 210 is configured to be capable of supplying each of a plurality of heat media each having a different temperature. The main body section 111 is included in the plasma processing system and has the plurality of flow paths 1112 formed therein, the plurality of flow paths 1112 respectively allowing the plurality of heat media to separately flow therethrough. The controller 2 is configured to perform control so that in a case where the first heat medium of the plurality of heat media is caused to flow to a flow path 1112 from the supply unit 210, a heat medium of the plurality of heat media and other than the first heat medium is discharged from a flow path 1112. The plasma processing system according to the embodiment thereby enables time for temperature of the main body section 111 to stabilize to be shortened.

[0079] Furthermore, the plasma processing system according to the above described embodiment further has the plurality of pipes 201 (first pipes), the plurality of pipes 202 (second pipes), the plurality of valves 221 (first valves), the plurality of pipes 203 (third pipes), and the plurality of valves 223 (second valves). The plurality of pipes 201 respectively connect one end of the plurality of flow paths 1112 in the main body section 111 and the supply unit 210 to each other and transport the plurality of heat media supplied from the supply unit 210 to the plurality of flow paths 1112. The plurality of pipes 202 respectively connect the other end of the plurality of flow paths 1112 in the main body section 111 and the supply unit 210 to each other and transport the heat media discharged from the plurality of flow paths 1112

CLAIMS

Claim 1. A substrate processing apparatus, comprising:

a heat medium supply unit configured to be capable of supplying each of a plurality of heat media each having a different temperature;

a component included in the substrate processing apparatus and having a plurality of flow paths formed in the component, the plurality of flow paths respectively allowing the plurality of heat media to separately flow through the plurality of flow paths; and

a controller configured to perform control so that in a case where a first heat medium of the plurality of heat media is caused to flow to the flow paths from the heat medium supply unit, a heat medium of the plurality of heat media and other than the first heat medium is discharged from the flow paths.

Claim 2. The substrate processing apparatus according to claim 1, further comprising:

a plurality of first pipes that respectively connect one end of the plurality of flow paths in the component and the heat medium supply unit to each other and transport the plurality of heat media supplied from the heat medium supply unit to the plurality of flow paths;

a plurality of second pipes that respectively connect the other end of the plurality of flow paths in the component and the heat medium supply unit to each other and transport a heat medium discharged from the plurality of flow paths to the heat medium supply unit;

a plurality of first valves respectively provided in the plurality of first pipes and capable of respectively opening and closing the plurality of first pipes;

a plurality of third pipes that respectively branch

off from the plurality of first pipes and respectively branch off from positions on one side off the first valves in the first pipes, the one side being toward the flow paths; and

a plurality of second valves respectively provided in the plurality of third pipes and capable of respectively opening and closing the plurality of third pipes, wherein

the controller is configured so that in a case where the first heat medium is caused to flow to the flow paths, the controller controls the first valve in the first pipe that transports the first heat medium, to be in an open state, controls the first valve in the first pipe that transports the heat medium other than the first heat medium, to be in a closed state, and control the second valve in the third pipe that branches off from the first pipe that transports the heat medium other than the first heat medium, to be in the open state.

Claim 3. The substrate processing apparatus according to claim 2, further comprising:

a first tank arranged at a position lower than that of the component, connected to the plurality of third pipes, and capable of retaining a heat medium.

Claim 4. The substrate processing apparatus according to claim 3, further comprising:

a first depressurizing unit configured to be capable of depressurizing the interior of the first tank, wherein

the controller is configured to depressurize the interior of the first tank by means of the first depressurizing unit and control the second valve in the third pipe to be in the open state, the third pipe branching off from the first pipe that transports the heat

medium other than the first heat medium.

Claim 5. The substrate processing apparatus according to claim 3 or 4, further comprising:

a plurality of fourth pipes that connect the first tank and the plurality of second pipes to each other; and

a plurality of third valves respectively provided in the plurality of fourth pipes and capable of respectively opening and closing the plurality of fourth pipes, wherein

the controller is configured so that in a case where the heat medium retained in the first tank is to be returned to the heat medium supply unit, the controller controls the third valve in the fourth pipe to be in the open state, the fourth pipe being connected to the second pipe that transports the heat medium other than the first heat medium to the heat medium supply unit.

Claim 6. The substrate processing apparatus according to claim 5, further comprising:

a first pressurizing unit configured to be capable of pressurizing the interior of the first tank, wherein

the controller is configured to pressurize the interior of the first tank by means of the first pressurizing unit and control the third valve in the fourth pipe to be in the open state, the fourth pipe being connected to the second pipe that transports the heat medium other than the first heat medium to the heat medium supply unit, in the case where the heat medium retained in the first tank is to be returned to the heat medium supply unit.

Claim 7. The substrate processing apparatus according to claim 2, further comprising:

a gas supply unit connected to the plurality of third pipes and configured to be capable of supplying a purge gas to the plurality of third pipes, wherein

the controller is configured to control, in a case where the first heat medium is caused to flow to the flow paths, the gas supply unit to supply the purge gas to the third pipe that branches off from the first pipe that transports the heat medium other than the first heat medium.

Claim 8. The substrate processing apparatus according to claim 7, further comprising:

a plurality of fourth valves respectively provided in the plurality of second pipes and capable of respectively opening and closing the plurality of second pipes;

a plurality of fifth pipes that respectively branch off from the plurality of second pipes and respectively branch off from positions on one side of the fourth valves in the second pipes, the one side being toward the flow paths;

a plurality of fifth valves respectively provided in the plurality of fifth pipes and capable of respectively opening and closing the plurality of fifth pipes; and

a second tank connected to the plurality of fifth pipes and capable of retaining a heat medium, wherein

the controller is configured so that in a case where the first heat medium is caused to flow to the flow paths, the controller controls the fourth valve in the second pipe that transports the first heat medium, to be in the open state, controls the fourth valve in the second pipe that transports the heat medium other than the first heat medium, to be in the closed state, controls the fifth valve in the fifth pipe that branches off from the second pipe

that transports the first heat medium, to be in the closed state, and controls the fifth valve in the fifth pipe that branches off from the second pipe that transports the heat medium other than the first heat medium, to be in the open state.

Claim 9. The substrate processing apparatus according to claim 8, further comprising:

a second depressurizing unit configured to be capable of depressurizing the interior of the second tank, wherein

the controller is configured to depressurize the interior of the second tank by means of the second depressurizing unit and control the fifth valve in the fifth pipe to be in the open state, the fifth pipe branching off from the second pipe that transports the heat medium other than the first heat medium.

Claim 10. The substrate processing apparatus according to claim 8 or 9, further comprising:

a plurality of sixth pipes that connect the second tank and the plurality of second pipes to each other and are respectively connected to the plurality of second pipes on one side of the fourth valves, the one side being toward the heat medium supply unit; and

a plurality of sixth valves respectively provided in the plurality of sixth pipes and capable of respectively opening and closing the plurality of sixth pipes, wherein

the controller is configured so that in a case where the heat medium retained in the second tank is to be returned to the heat medium supply unit, the controller controls the sixth valve in the sixth pipe to be in the open state, the sixth pipe being connected to the second pipe that transports the heat medium other than the first

heat medium to the heat medium supply unit.

Claim 11. The substrate processing apparatus according to claim 10, further comprising:

a second pressurizing unit configured to be capable of pressurizing the interior of the second tank, wherein

the controller is configured to pressurize the interior of the second tank by means of the second pressurizing unit and control the sixth valve in the sixth pipe to be in the open state, the sixth pipe being connected to the second pipe that transports the heat medium other than the first heat medium to the heat medium supply unit, in the case where the heat medium retained in the second tank is to be returned to the heat medium supply unit.

Claim 12. The substrate processing apparatus according to any one of claims 1 to 11, wherein the component is configured so that heat transfer between the plurality of flow paths is reduced.

Claim 13. The substrate processing apparatus according to any one of claims 1 to 11, wherein the component is a stage having a placing surface where a substrate is to be placed and the plurality of flow paths are formed in an area below the placing surface.

Claim 14. A temperature control device, comprising:

a heat medium supply unit configured to be capable of supplying each of a plurality of heat media each having a different temperature; and

a controller configured to perform control so that in a case where a first heat medium of the plurality of heat

media is caused to flow from the heat medium supply unit to a plurality of flow paths that are formed in a target member to be subjected to temperature control, are individually connected to the heat medium supply unit, and respectively allow the plurality of heat media to separately flow therethrough, a heat medium of the plurality of heat media and other than the first heat medium is discharged from the flow paths.

Claim 15. A temperature control method, including:

a process of causing a first heat medium of a plurality of heat media each having a different temperature to flow from a heat medium supply unit configured to be capable of supplying each of the plurality of heat media, to a plurality of flow paths formed in a component included in a substrate processing apparatus, the plurality of flow paths being individually connected to the heat medium supply unit and respectively allowing the plurality of heat media to separately flow therethrough; and

a process of performing control so that in a case where the first heat medium is caused to flow to the flow paths, a heat medium of the plurality of heat media and other than the first heat medium is discharged from the flow paths.