CLAIMS

[Claim 1]

A processing method for performing plasma processing on a substrate, the method comprising:

placing a temperature adjustment target onto a support surface of a substrate support in a processing chamber being decompressible;

forming a heat transfer layer for the temperature adjustment target on the support surface of the substrate support, the heat transfer layer being deformable and including at least one of a liquid layer or a deformable solid layer; and

performing plasma processing on the substrate on the support surface on which the heat transfer layer is formed,

wherein the forming the heat transfer layer includes supplying a raw gas being a raw material for the heat transfer layer into a processing space in the processing chamber.

[Claim 2]

The processing method according to claim 1, wherein

the processing chamber includes a wall defining the processing space, and

the supplying the raw gas includes supplying the raw gas through the wall.

[Claim 3]

The processing method according to claim 1, wherein

the supplying the raw gas includes supplying the raw gas through the substrate support.

[Claim 4]

The processing method according to claim 1, wherein

the supplying the raw gas includes supplying the raw gas through a transferrer configured to transfer the substrate to the processing chamber.

[Claim 5]

The processing method according to any one of claims 1 to 4, wherein

the forming the heat transfer layer includes forming the heat transfer layer from the raw gas using plasma.

[Claim 6]

The processing method according to any one of claims 1 to 4, wherein

the forming the heat transfer layer includes forming the heat transfer layer by at least one of the raw gas being liquefied or solidified on the support surface being cooled.

[Claim 7]

The processing method according to any one of claims 1 to 4, wherein

the forming the heat transfer layer includes forming the heat transfer layer on the support surface by placing the temperature adjustment target onto the support surface in the step of placing the temperature adjustment target, the temperature adjustment target having the heat transfer layer formed on its lower surface onto the support surface.

[Claim 8]

The processing method according to any one of claims 1 to 4, wherein

the forming the heat transfer layer includes forming the heat transfer layer on the support surface with the temperature adjustment target being located in the processing chamber and being separate from the support surface.

[Claim 9]

The processing method according to any one of claims 1 to 4, wherein

the forming the heat transfer layer is performed before the placing the temperature adjustment target.

[Claim 10]

The processing method according to claim 1, wherein

the forming the heat transfer layer is performed after the placing the temperature adjustment target.

[Claim 11]

The processing method according to any one of claims 1 to 4, further comprising:

removing the heat transfer layer formed on a portion in the processing chamber other than the support surface.

[Claim 12]

The processing method according to any one of claims 1 to 4, further comprising:

removing the heat transfer layer from the support surface after the performing plasma processing.

[Claim 13]

The processing method according to claim 12, wherein

the removing the heat transfer layer from the support surface includes heating the support surface to vaporize the heat transfer layer.

[Claim 14]

A processing method for performing plasma processing on a substrate, the method comprising:

placing a temperature adjustment target onto a support surface of a substrate support in a processing chamber being decompressible;

forming a heat transfer layer for the temperature adjustment target on the support surface of the substrate support, the heat transfer layer being deformable and including at least one of a liquid layer or a deformable solid layer;

performing plasma processing on the substrate on the support surface on which the heat transfer layer is formed; and

removing the heat transfer layer from the support surface after the performing plasma processing, wherein

the removing the heat transfer layer from the support surface includes removing the heat transfer layer using plasma.

[Claim 15]

The processing method according to any one of claims 1 to 4, further comprising:

electrostatically clamping the temperature adjustment target onto the support surface with an electrostatic force from an electrostatic chuck.

[Claim 16]

The processing method according to any one of claims 1 to 4, wherein

the temperature adjustment target is at least one of the substrate, a tray and an edge ring surrounding the substrate on the support surface.

[Claim 17]

A plasma processing apparatus, comprising:

a processing chamber being decompressible;

a substrate support located in the processing chamber and including a support surface on which a substrate is placeable;

a heat transfer layer formation unit configured to form a heat transfer layer for the temperature adjustment target on the support surface of the substrate support, the heat transfer layer being deformable and including at least one of a liquid layer or a deformable solid layer; and

a controller configured to perform control to cause operations including:

placing the temperature adjustment target onto the support surface, and

performing plasma processing on the substrate on the support surface on which the heat transfer layer is formed,

wherein the heat transfer layer formation unit supplies a raw gas being a raw material for the heat transfer layer into a processing space in the processing chamber.

[Claim 18]

The plasma processing apparatus according to claim 17, wherein

the heat transfer layer formation unit places, onto the support surface, the temperature adjustment target having the heat transfer layer formed on its lower surface to form the heat transfer layer on the support surface.

[Claim 19]

The plasma processing apparatus according to any one of claims 17 to 18, wherein

the heat transfer layer formation unit forms the heat transfer layer on the support surface with the temperature adjustment target being located in the processing chamber and being separate from the support surface.

[Claim 20]

The plasma processing apparatus according to any one of claims 17 to 18, wherein

the temperature adjustment target is at least one of the substrate, a tray and an edge ring surrounding the substrate on the support surface.

[Claim 21]

The plasma processing apparatus according to any one of claims 17 to 18, wherein

the substrate support includes an electrostatic chuck, and

the controller performs control to electrostatically clamp the temperature adjustment target onto the support surface with an electrostatic force from the electrostatic chuck.

[Claim 22]

The processing method according to claim 2,

wherein the wall is an upper electrode located above the substrate support, the upper electrode having a gas inlet introducing the raw gas into the processing space, and

wherein the supplying the raw gas includes supplying the raw gas through the gas inlet.

[Claim 23]

The processing method according to any one of claims 1 to 4, wherein the forming the heat transfer layer includes forming the heat transfer layer from the raw gas by irradiating light.

[Claim 24]

The processing method according to claim 12,

wherein the removing the heat transfer layer from the support surface includes removing the heat transfer layer by irradiating light.

[Claim 25]

The plasma processing apparatus according to claim 17 or 18, wherein the heat transfer layer formation unit includes a gas supply unit supplying the raw gas, the processing chamber includes a wall defining the processing space, and the wall has a gas inlet connected to the gas supply unit.

[Claim 26]

The plasma processing apparatus according to claim 17 or 18, wherein the heat transfer layer formation unit includes a gas supply unit supplying the raw gas, the processing chamber includes an upper electrode located above the substrate support, and the upper electrode has a gas inlet connected to the gas supply unit.