SUBSTRATE SUPPORT AND PLASMA PROCESSING APPARATUS

Technical Field

[0001]

The present disclosure relates to a substrate support and a plasma processing apparatus.

Background Art

[0002]

Patent Literature 1 discloses a plasma processing system in which an edge ring is transferred into a plasma processing apparatus by a transfer device and the edge ring is placed on an electrostatic chuck of a stage.

Citation List

Patent Documents

[0003]

Patent Document 1: JP2021-61415A

Summary of Invention

Technical Problem

[0004]

Embodiments the present disclosure provides a substrate support and a plasma processing apparatus for placing an edge ring on an electrostatic chuck with high positional accuracy.

[0005]

According to a first aspect of the present invention, there is provided a substrate support, which includes: a base; a first electrostatic chuck region disposed at an upper portion of the base, the first electrostatic chuck region having a substrate support surface, and being configured to hold a substrate on the substrate support surface; and a second electrostatic chuck region disposed at the upper portion of the base to surround the first electrostatic chuck region, the second electrostatic chuck region having a ring support surface, and being configured to hold an edge ring on the ring support surface, in which the second electrostatic chuck region is provided with a positioning pin of the edge ring, the positioning pin being formed of a material having a linear expansion coefficient substantially equal to a linear expansion coefficient of a material forming the second electrostatic chuck region.

[0005a]

According to a second aspect of the present invention, there is provided a substrate support including: a base; a first electrostatic chuck region disposed at an upper portion of the base, the first electrostatic chuck region having a substrate support surface, and being configured to hold a substrate on the substrate support surface; and a second electrostatic chuck region disposed at the upper portion of the base to surround the first electrostatic chuck region, the second electrostatic chuck region having a ring support surface, and being configured to hold an edge ring on the ring support surface, wherein the second electrostatic chuck region has a supply hole, through which a heat transfer gas is supplied between an upper surface of the second electrostatic chuck region and the edge ring, and a part of a positioning pin of the edge ring is provided inside the supply hole.

[0005b]

According to a third aspect of the present invention, there is provided a plasma processing apparatus including: a plasma processing chamber; a substrate support provided in the plasma processing chamber and configured to hold a substrate and an edge ring; a gas supply configured to supply a processing gas to the plasma processing chamber; and a plasma generator configured to generate plasma from the processing gas, wherein the substrate support includes a base, a first electrostatic chuck region disposed at an upper portion of the base, the first electrostatic chuck region having a substrate support surface, and being configured to hold the

substrate on the substrate support surface, and a second electrostatic chuck region disposed at the upper portion of the base to surround the first electrostatic chuck region, the second electrostatic chuck region having a ring support surface, and being configured to hold an edge ring on the ring support surface, the second electrostatic chuck region has a supply hole, through which a heat transfer gas is supplied between an upper surface of the second electrostatic chuck region and the edge ring, and a part of a positioning pin of the edge ring is provided inside the supply hole.

[0005c]

According to a fourth aspect of the present invention, there is provided a substrate support including: a base; a first electrostatic chuck region disposed at an upper portion of the base, the first electrostatic chuck region having a substrate support surface, and being configured to hold a substrate on the substrate support surface; and a second electrostatic chuck region disposed at the upper portion of the base to surround the first electrostatic chuck region, the second electrostatic chuck region having a ring support surface, and being configured to hold an edge ring on the ring support surface, wherein the second electrostatic chuck region is provided with a positioning pin of the edge ring, the positioning pin being formed of a material having such a linear expansion coefficient that a material forming the second electrostatic chuck region is not damaged when an amount of change in a temperature of the substrate within a predetermined time is controlled to 200°C or lower.

Advantageous Effects of Invention

[0006]

According to the above aspects, a substrate support and a plasma processing apparatus for placing an edge ring on an electrostatic chuck with high positional accuracy are provided.

Brief Description of Drawings

[0007]

[FIG. 1] is a drawing showing an example of a configuration of a plasma processing apparatus.

[FIG. 2] is an example of a partially enlarged cross-sectional view of a substrate support according to a first embodiment.

[FIG. 3] is an example of a plan view of a main body.

[FIG. 4] is an example of a bottom view of a ring assembly.

[FIG. 5A] is an example of a side view of a positioning pin.

[FIG. 5B] is an example of a top view of the positioning pin.

[FIG. 5C] is an example of a cross-sectional view of the positioning pin.

[FIG. 6] is an example of a configuration diagram of another positioning pin.

[FIG. 7] is an example of a partially enlarged cross-sectional view of a substrate support according to a second embodiment.

Description of Embodiments

[0008]

Hereinafter, various exemplary embodiments will be described in detail with reference to the drawings. Further, like reference numerals will be given to like or corresponding parts throughout the drawings.

[0009]

An example of a configuration of a plasma processing system will be described with reference to FIG. 1. FIG. 1 is a view for explaining an example of a configuration of a capacitively-coupled plasma processing apparatus.

[0010]

The plasma processing system includes a capacitively-coupled plasma processing apparatus 1 and a controller 2. The capacitively-coupled plasma processing apparatus 1 includes the plasma processing chamber 10, a gas supply 20, a power source 30, and an exhaust system