

CLAIMS

1. A substrate support comprising:

a main body having a substrate supporting region and an
5 annular region surrounding the substrate supporting region;

a first ring disposed on the annular region and having
a through-hole;

a second ring disposed on the first ring and having an
inner peripheral surface facing an end surface of a substrate
10 on the substrate supporting region; and

a lift pin including a lower rod and an upper rod,
wherein the lower rod has an upper end surface to be in
contact with the first ring, and

the upper rod extends upward from the upper end surface
15 of the lower rod to be in contact with the second ring through
the through-hole of the first ring and has a length greater
than a length of the through-hole

wherein the first ring includes an inner peripheral
region, an intermediate mounting region in which the through-
20 hole is formed and an outer peripheral region, an upper
surface of the intermediate mounting region positioned lower
than an upper surface of the inner peripheral region and an
upper surface of the outer peripheral region, and

the first ring defines a recess on the intermediate
25 mounting region which receives the second ring on the
intermediate mounting region fitted in the recess.

2. The substrate support of claim 1, wherein the upper rod is thinner than the lower rod.
- 5 3. The substrate support of claim 1 or 2, wherein each of the lower rod and the upper rod has a cylindrical shape, and a diameter of the lower rod is greater than a diameter of the upper rod.
- 10 4. The substrate support of claim 3, wherein the upper rod includes:
a first portion extending upward from the lower rod;
a second portion extending upward from the first portion and having a tip end,
15 wherein the first portion is thicker than the second portion.
5. The substrate support of claim 4, wherein each of the lower rod, the first portion, and the second portion has a
20 cylindrical shape, and
the first portion has a diameter that is smaller than the diameter of the lower rod and greater than a diameter of the second portion.
- 25 6. The substrate support of claim 5, wherein the upper rod further has a tapered portion between the first portion and

the second portion.

7. The substrate support of claim 6, wherein the second ring has a recess into which the tip end of the upper rod is fitted.

8. The substrate support of any one of claims 1 to 7, wherein the main body includes a base and an electrostatic chuck disposed on the base.

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9. The substrate support of claim 8, wherein the first ring is positioned on the electrostatic chuck.

10. The substrate support of any one of claims 1 to 9, wherein the inner peripheral region of the first ring has a first thickness that extends from a bottom surface of the inner peripheral region to the upper surface of the inner peripheral region, the intermediate mounting region of the first ring has a second thickness that extends from a bottom surface of the intermediate peripheral region to the upper surface of the intermediate mounting region, and the outer peripheral region of the first ring has a third thickness that extends from a bottom surface of the outer peripheral region to the upper surface of the outer peripheral region, and wherein the bottom surface of the inner peripheral region, the bottom surface of the intermediate mounting region, and

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the bottom surface of the outer peripheral region form a single horizontal plane on a bottom surface of the first ring, and the first and third thicknesses are greater than the second thickness.

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11. The substrate support according to any one of claims 1 to 10, wherein at least part of each of the inner region, the intermediate region and the outer region is supported on the annular region of the main body.

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12. A plasma processing apparatus comprising:

a chamber;

the substrate support described in any one of claims 1 to 11 and disposed in the chamber; and

15 a driving unit configured to raise and lower the lift pin.

13. The plasma processing apparatus of claim 12, further comprising:

20 a gas supply unit configured to supply a cleaning gas into the chamber;

an energy source configured to supply energy for generating plasma from the cleaning gas into the chamber; and

a controller,

25 wherein the controller is configured

to control the driving unit such that both of the

first ring and the second ring or only the second ring is
lifted upward from the substrate support by the lift pin, and
to control the gas supply unit to supply the
cleaning gas into the chamber and the energy source to
5 generate plasma from the cleaning gas in a state where both
of the first ring and the second ring or only the second ring
is lifted upward from the substrate support.

14. The plasma processing apparatus of claim 13, wherein the
10 controller is configured to:

control the driving unit such that both of the first
ring and the second ring or only the second ring is lifted
upward from the substrate support by the lift pin for removal
of the first ring and the second ring or only the second ring
15 from the processing apparatus, and control the driving unit
such that only the second ring is lifted upward from the
substrate support by the lift pin to adjust a height position
of a boundary between plasma and sheath during plasma
processing.

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