PLASMA PROCESSING APPARATUS AND PLASMA PROCESSING METHOD

FIELD

[0001] Exemplary embodiments of the disclosure relate to a plasma processing apparatus and a substrate processing system.

BACKGROUND

[0002] A plasma processing apparatus is used to perform plasma processing on a substrate. The plasma processing apparatus includes a chamber and a substrate support. The substrate support is located in the chamber. The substrate support includes a base and an electrostatic chuck. The base is coupled to a bias power supply that generates an electrical bias to draw ions from plasma into the substrate. The electrostatic chuck supports the substrate and an edge ring to surround the substrate. Patent Literature 1 describes a plasma processing apparatus that raises and lowers the edge ring.

CITATION LIST

PATENT LITERATURE

[0003] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2020-113753

BRIEF SUMMARY

TECHNICAL PROBLEM

[0004] The disclosure is directed to a technique for reducing wear of an edge ring.

SOLUTION TO PROBLEM

[0005]

According to a first aspect of the present disclosure, there is provided a plasma processing apparatus including: a chamber; a substrate support in the chamber, the substrate support including a base, and an electrostatic chuck on the base; a plasma generator including a radio-frequency power supply and configured to generate plasma in the chamber; a bias power supply configured to generate an electrical bias to draw ions from the plasma into a substrate on the

substrate support, the bias power supply and/or the radio-frequency power supply being electrically coupled to the base; an edge ring placed to surround the substrate on the substrate support, the edge ring being conductive; a lifter configured to raise and lower the edge ring, the lifter including a conductive ring configured to be electrically coupled to the edge ring while supporting the edge ring placed on the conductive ring, a rod extending in a vertical direction below the conductive ring, an actuator configured to raise and lower the edge ring with the rod and the conductive ring, and a connector configured to electrically couple the conductive ring and the base; a switch configured to switch between a first state in which the edge ring and the base are electrically coupled to each other and a second state in which the edge ring and the base are electrically disconnected from each other; and a controller configured to control the switch to switch between the first state and the second state.

[0005a] According to a second aspect of the present disclosure, there is provided a plasma processing method implementable using the above plasma processing apparatus, the method including: reading, with the controller, a recipe; controlling the switch based on the recipe; and performing plasma processing based on the recipe.

ADVANTAGEOUS EFFECTS

[0006] Embodiments of the present disclosure reduce wear of the edge ring.

BRIEF DESCRIPTION OF DRAWINGS

[0007] FIG. 1 is a diagram of a plasma processing system with an example structure.

FIG. 2 is a diagram of a capacitively coupled plasma processing apparatus with an example structure.

FIG. 3 is a diagram of a substrate support and a lifter in one exemplary embodiment.

FIG. 4 is a diagram of a substrate support and a lifter in another exemplary embodiment.

FIG. 5 is a diagram of a switch and a sensor in the plasma processing apparatus according to one exemplary embodiment.

FIG. 6 is a diagram of a substrate processing system according to one exemplary embodiment.

FIG. 7 is a diagram of a substrate support and a lifter in still another exemplary embodiment.