Claims

1. A method of chucking one or more substrates in a substrate processing chamber, comprising:

applying a chucking voltage to a pedestal, with a substrate disposed on a support surface of the pedestal;

ramping the chucking voltage from the applied voltage;

detecting an impedance shift of a component of the substrate processing chamber while ramping the chucking voltage;

determining a corresponding chucking voltage at which the impedance shift occurs; and

determining a refined chucking voltage based on the impedance shift and the corresponding chucking voltage.

2. The method of claim 1, wherein the component is a radio frequency energy generator that supplies radio frequency energy to the substrate processing chamber.

3. The method of claim 1, wherein the detecting the impedance shift comprises measuring the impedance shift, and the method further comprises applying the refined chucking voltage during a deposition process.

4. The method of claim 1, wherein the applying the chucking voltage to the pedestal comprises ramping up the chucking voltage until the impedance shift occurs.

5. The method of claim 1, wherein the refined chucking voltage is a minimum voltage value that chucks the substrate to the support surface of the pedestal, the refined chucking voltage reduces a bow of the substrate, and the method further comprises generating a plasma.

6. The method of claim 1, wherein the applying the chucking voltage to the pedestal, the detecting the impedance shift, and the determining the refined chucking voltage are repeated on one or more additional substrates.

7. A method of chucking one or more substrates in a substrate processing chamber, comprising:

applying a chucking voltage to a pedestal using a preselected value, with a substrate disposed on a support surface of the pedestal;

detecting an impedance shift of a component of the substrate processing chamber;

determining a refined chucking voltage based on the impedance shift; and

adjusting the applied chucking voltage using the refined chucking voltage.

8. The method of claim 7, wherein the component is a radio frequency energy generator that supplies radio frequency energy to the substrate processing chamber.

9. The method of claim 7, wherein the detecting the impedance shift comprises measuring the impedance shift.

10. The method of claim 7, further comprising conducting a deposition process.

11. The method of claim 7, wherein the applying the chucking voltage to the pedestal using the preselected value comprises ramping up the chucking voltage towards the preselected value until the impedance shift occurs.

12. The method of claim 7, wherein the refined chucking voltage is a minimum voltage value that chucks the substrate to the support surface of the pedestal, the refined chucking voltage reduces a bow of the substrate, and the method further comprises generating a plasma.

13. The method of claim 7, wherein the applying the chucking voltage to the pedestal, the detecting the impedance shift, and the determining the refined chucking voltage are repeated on one or more additional substrates.

14. A controller for substrate processing chamber systems, comprising:

a processor; and

a set of computer instructions that, when executed, instruct the processor to:

cause a direct current voltage generator to apply a chucking voltage to a pedestal,

cause an impedance detector to detect an impedance shift of a component of a substrate processing chamber, and

determine a refined chucking voltage based on the impedance shift.

15. The controller of claim 14, wherein the set of computer instructions, when executed, instruct the processor to store the refined chucking voltage in a memory.

16. The controller of claim 14, wherein the component is one or more of a substrate, a pedestal, an electrode, a heating power source, a DC voltage generator, a chamber body, a chamber lid, a support surface, a faceplate, a backing plate, or a radio frequency energy generator.