

CLAIMS

WHAT IS CLAIMED IS:

1. An impedance matching method applied to semiconductor processing equipment comprising:

a processing preparation step including obtaining currently stored impedance-matching data corresponding to a processing ignition step, the impedance-matching data including a parameter adjustment position corresponding to a parameter adjustable device in an impedance-matching device of the semiconductor processing equipment, and adjusting the parameter adjustable device based on the parameter adjustment position, wherein for a semiconductor processing that is performed multiple times, the currently stored impedance-matching data is a value that is updated multiple times; and

the processing ignition step including applying radio frequency (RF) power to a processing chamber of the semiconductor processing equipment through the impedance-matching device, performing impedance matching through the impedance-matching device, and determining a current parameter adjustment position of the parameter adjustable device when impedance is matched, and updating the impedance-matching data based on the current parameter adjustment position.

2. The method according to claim 1, wherein an operation mode of the impedance-matching device includes an automatic matching mode and a non-automatic matching mode;

in the processing preparation step, the impedance-matching device is set to the non-automatic matching mode; and

in the processing ignition step, the impedance-matching device is set to the automatic matching mode.

3. The method according to claim 1, wherein the parameter adjustment position includes a first parameter adjustment position, a parameter correction value, and a second parameter adjustment position, wherein the second parameter adjustment position is a sum of the first parameter adjustment position and the parameter correction value; and

adjusting the parameter adjustable device based on the parameter adjustment positions includes:

adjusting the parameter adjustable device based on the second parameter adjustment position.

4. The method according to claim 3, wherein updating the impedance-matching data based on the current parameter adjustment position includes:

updating the first parameter adjustment position based on the current parameter adjustment position; and

updating the second parameter adjustment position based on the updated first parameter adjustment position and the parameter correction value.

5. The method according to claim 3 or 4, wherein the parameter adjustment position further includes a predetermined parameter matching value; the second parameter adjustment position is a sum of the first parameter adjustment position, the predetermined parameter matching value, and the parameter correction value;

after adjusting the parameter adjustable device according to the second parameter adjustment position, impedance matching information of the impedance-matching device satisfies a predetermined condition;

the impedance matching information includes at least one of a total impedance matching time length, or a difference in impedance matching time lengths corresponding to processing ignition steps; and

the predetermined condition includes at least one of the total impedance matching time length being shortest, or the difference in the impedance matching time lengths corresponding to the processing ignition steps being minimum.

6. The method according to claim 5, further comprising:

determining a plurality of to-be-filtered parameter matching values corresponding to the parameter adjustable device;

adjusting the parameter adjustment position of the parameter adjustable device according to the second parameter adjustment position corresponding to the plurality of to-be-filtered parameter matching values;

each time after adjusting the parameter adjustment position of the parameter adjustable device, performing ignition once and determining the impedance matching time lengths corresponding to the to-be-filtered parameter matching values; and

determining a to-be-filtered parameter matching value corresponding to the impedance matching time length that meets the predetermined condition as the predetermined parameter matching value according to the plurality of impedance matching time lengths.

7. The method according to claim 1, wherein the parameter adjustable device includes an adjustable capacitor and/or an adjustable inductor.

8. A semiconductor processing equipment comprising a radio frequency (RF) power source, an impedance-matching device, and a processing chamber, wherein:

the RF power source is configured to apply RF power to the processing chamber of the semiconductor processing equipment through the impedance-matching device; and

the impedance-matching device includes a controller and a parameter adjustable device, the controller being configured to, in a processing preparation step, obtain currently stored impedance-matching data corresponding to a processing ignition step, the impedance-matching data including a parameter adjustment position corresponding to the parameter adjustable device in the impedance-matching device of the semiconductor processing equipment, adjust the parameter adjustable device based on the parameter adjustment position, wherein for a semiconductor processing that is performed multiple times, the currently stored impedance-matching data is a value that is updated multiple times, and in a processing ignition step, when applying the RF power to the processing chamber of the semiconductor processing equipment through the impedance-matching device, adjust the parameter adjustable device to achieve impedance matching, determine a current parameter adjustment position of the parameter adjustable device when impedance is matched, and update the impedance-matching data based on the current parameter adjustment position.

9. The semiconductor processing equipment according to claim 8, wherein an operation mode of the impedance-matching device includes an automatic matching mode and a non-automatic matching mode;

the controller is further configured to, in the processing preparation step, set the impedance-matching device to the non-automatic matching mode, and in the processing ignition step, set the impedance-matching device to the automatic matching mode.

10. The semiconductor processing equipment according to claim 8, wherein the parameter adjustment position includes a first parameter adjustment position, a parameter correction value, and a second parameter adjustment position, wherein the second parameter adjustment position is a sum of the first parameter adjustment position and the parameter correction value; and

the controller is further configured to adjust the parameter-adjustable device based on the second parameter adjustment position.