[CLAIMS]

[Claim 1]

A cleaning device for removing foreign matter in a vacuum processing chamber of a semiconductor manufacturing apparatus, the cleaning device comprising:

a foreign matter attraction unit in which attraction electrodes composed of a pair of electrodes are provided inside an insulator; and an attraction control unit that turns on a control switch to charge the attraction electrodes and generate an electrostatic clamping force on a surface of the insulator to enable attraction of foreign matter, wherein

the control switch of the attraction control unit is a remotely-operable switch that is externally operable, and foreign matter in the vacuum processing chamber is removed by an electrostatic clamping force generated in a vacuum state by turning on the control switch for the cleaning device in a vacuum closed space closed in the vacuum state.

[Claim 2]

The cleaning device according to claim 1, wherein

the attraction control unit includes a connection terminal for connection with an external power supply, a capacitor that is charged by a voltage of the external power supply and that stores an electric charge, and a discharge switch that discharges the charge stored in the capacitor to charge the attraction electrodes, and the control switch is configured by the discharge switch; and

when the capacitor is charged by connection of the external power supply to the connection terminal under the atmospheric pressure and then the cleaning device is placed in a vacuum closed space and the discharge switch is turned on, an electrostatic clamping force is generated in a vacuum state.

[Claim 3]

The cleaning device according to claim 2, wherein the discharge switch is a reed switch operated by a magnetic force, and a conduction current between a capacitor and the attraction electrodes is energized in the reed switch.

[Claim 4]

The cleaning device according to claim 2, wherein the discharge switch is configured of a switching circuit including a solid-state relay, a battery that operates the solid-state relay, and a circuit switch connecting the solid-state relate and the battery, and the circuit switch is any remotely-operable switch selected from the group consisting of a timer type switch, a laser sensing type switch, and a reed switch operated by a magnetic force.

[Claim 5]

The cleaning device according to claim 1, wherein the attraction control unit includes a booster circuit that boosts a voltage, a battery that operates the booster circuit, and a voltage application switch for charging the attraction electrodes by a high voltage output from the booster circuit,

the voltage application switch constituting the control switch, and

an electrostatic clamping force is generated in a vacuum state by arranging the cleaning device in a closed vacuum space and turning on the voltage application switch.

[Claim 6]

The cleaning device according to claim 5, wherein the voltage application switch is any remotely-operable switch selected from the group consisting of a switch with a timer , a laser-sensing switch, and a reed switch that is operated by a magnetic force.

[Claim 7]

The cleaning device according to claim 5 or 6, wherein the attraction control unit has a diode between the booster circuit and the attraction electrodes, and charging of the attraction electrodes by a high voltage output from the booster circuit is maintained by a rectifying action.

[Claim 8]

The cleaning device according to any one of claims 1 to 7, wherein the attraction control unit includes a GND terminal for releasing an electric charge of the charged attraction electrodes, and a GND switch that connects between the attraction electrodes and the GND terminal, and after foreign matter in the vacuum processing chamber has been attracted, the foreign matter is removed from the surface of the

insulator of the foreign matter attraction unit by turning on the GND switch.

[Claim 9]

The cleaning device according to any one of claims 1 to 8, wherein the foreign matter attraction unit and the attraction control unit are integrally provided on one surface of a base portion having a shape imitating an object to be processed in a semiconductor manufacturing apparatus, and the foreign matter attraction unit is provided on one surface of the base portion and the attraction control unit is provided on the other surface of the base portion, and the insulator of the foreign matter attraction unit is arranged so as to face a wafer mounting table in the vacuum processing chamber of a semiconductor manufacturing apparatus to remove foreign matter on the wafer mounting table.

[Claim 10]

The cleaning device according to claim 9, further comprising a protrusion for separating a surface of the insulator in the foreign matter attraction unit and the wafer mounting table from each other.

[Claim 11]

The cleaning device according to claim 10, wherein the surface of the insulator in the foreign matter attraction unit includes an adhesive layer having adhesiveness.