CLAIMS

1. A substrate carrying device for carrying a processed workpiece and regulating the temperature of the processed workpiece by means of a heat exchange gas, wherein an upper surface of the substrate carrying device is provided with a plurality of substrate mounting locations, and a heat-exchange gas inlet passage is arranged in the substrate carrying device corresponding to each substrate mounting location so as to guide the heat exchange gas to an upper surface of the substrate mounting location, the substrate carrying device being characterized in that:

the heat-exchange gas inlet passage comprises a peripheral inlet passage and a middle inlet passage,

gas inlets of the peripheral inlet passage and the middle inlet passage are all in communication with an external gas source,

a gas outlet of the peripheral inlet passage is arranged in a peripheral region of the upper surface of the substrate mounting location, and

a gas outlet of the middle inlet passage is arranged in the middle region of the upper surface of the substrate mounting location,

wherein the total area of the gas outlets of the peripheral inlet passages is less than that of the gas outlets of the middle inlet passages.

2. The substrate carrying device according to claim 1, characterized in that, for each substrate mounting location, a plurality of gas outlets of the peripheral inlet passages and a plurality of gas outlet of the middle inlet passages are arranged as hole-shaped structures, and the plurality of gas outlets of the peripheral inlet passages and the plurality of gas outlets of the middle inlet passages are arranged into at least one ring uniformly along the peripheral directions of the substrate mounting locations, respectively.

3. The substrate carrying device according to claim 1 or 2, characterized in that, for each substrate mounting location, its peripheral region and/or its middle region is formed with a groove which is concave from the upper surface of the substrate carrying device, and the gas outlets of the peripheral inlet passages and the gas outlets of the middle inlet passages are positioned on a bottom surface or a side surface of the groove.

4. The substrate carrying device according to claim 3, characterized in that, the groove

extends along the peripheral direction of the substrate mounting location and is closed in a ring shape.

5. The substrate carrying device according to claim 1, characterized in that, the diameter of the gas outlet of the peripheral inlet passage is less than that of the gas outlet of the middle inlet passage.

6. The substrate carrying device according to claim 5, characterized in that, the diameter of the gas outlet of the peripheral inlet passage is one third to two thirds of that of the gas outlet of the middle inlet passage.

7. The substrate carrying device according to claim 6, characterized in that, the diameter of the gas outlet of the middle inlet passage is 0.6mm-1mm.

8. The substrate carrying device according to any one of claims 5 to 7, characterized in that, the number of the gas outlets of the peripheral inlet passages is equal to that of the gas outlets of the middle inlet passages.

9. The substrate carrying device according to claim 1, characterized in that, along the radial direction of the substrate mounting location, the distance between the gas outlet of the peripheral inlet passage at the outermost side and an edge of the substrate mounting location is 2mm-5mm.

10. The substrate carrying device according to claim 2, characterized in that, the plurality of gas outlets of the middle inlet passages are arranged into one ring, and their positions in the radial direction of the substrate mounting location are at one half of the radius of the substrate mounting location.

11. The substrate carrying device according to claim 1, characterized in that, the heat-exchange gas inlet passage also comprise a central inlet passage, wherein a gas inlet of the central inlet passage is in communication with the external gas source, and a gas outlet of the central inlet passage is arranged in the middle of the upper surface of the substrate mounting location.

12. A plasma processing equipment comprising a reaction chamber, a gas source, a clamping device positioned in the reaction chamber, and a substrate carrying device positioned on the

clamping device, wherein the substrate carrying device is configured to carry a processed workpiece and regulate the temperature of the processed workpiece by means of a heat exchange gas provided by the gas source, the plasma processing equipment being characterized in that, the substrate carrying device adopts the substrate carrying device according to any one of claims 1 to 11, and the heat-exchange gas inlet passage in the substrate carrying device is in communication with the gas source.

13. The plasma processing equipment according to claim 12, characterized in that, a first gas path and a second gas path which are independent with respect to each other are arranged in the clamping device, wherein

an outlet end of the first gas path extends to an upper surface of the clamping device and is solely in communication with the middle inlet passages; an inlet end of the first gas path is in communication with the gas source,

an outlet end of the second gas path extends to the upper surface of the clamping device and is solely in communication with the peripheral inlet passages, and an inlet end of the second gas path is in communication with the gas source.

14. The plasma processing equipment according to claim 12, characterized in that, the gas source comprises a first gas source and a second gas source, and a first gas path and a second gas path which are independent with respect to each other are arranged in the clamping device, wherein

an outlet end of the first gas path extends to an upper surface of the clamping device and is solely in communication with the middle inlet passages, an inlet end of the first gas path is in communication with the first gas source; and

an outlet end of the second gas path extends to the upper surface of the clamping device and is solely in communication with the peripheral inlet passages, and an inlet end of the second gas path is in communication with the second gas source.

15. The plasma processing equipment according to claim 12, characterized in that, gas paths are arranged in the clamping device, an outlet end of the gas path extends to the upper surface of the clamping device and are in communication with the middle and peripheral inlet passages, respectively; the inlet ends of the gas paths are in communication with the gas source, and the gas source supplies the heat exchange gas to the middle and peripheral inlet passages via the gas paths at the same time.

16. The plasma processing equipment according to any one of claims 12 to 15, characterized

in that, a pressure flow controller or a mass flow controller is arranged at the upstream of the gas outlet of the peripheral inlet passage and the upstream of the gas outlet of the middle inlet passage.

17. The plasma processing equipment according to claim 16, characterized in that, the pressure flow controller is configured to regulate the amount of the heat-exchange gas flowing through the middle inlet passages; and

the mass flow controller is configured to regulate the amount of the heat-exchange gas flowing through the peripheral inlet passages.