CLAIMS

1. An epitaxial growth device comprising:

a reaction chamber defined by a susceptor configured to support a substrate during processing;

a ring-like support portion having a through-hole as viewed from above, the ring-like support portion having an inner wall comprising two inclined opposing face portions, each of which taper gradually toward the susceptor;

a ceiling board which is transmissive to light disposed on the inner wall of the ring-like support portion, the ceiling board defining a height between the susceptor and the ceiling board that is substantially equal across a width of the susceptor;

a heating unit located outside of the reaction chamber for heating a substrate set inside of the reaction chamber via the ceiling board; and

a reactant gas-introduction unit for introducing a reactant gas into the reaction chamber in a direction parallel to a horizontal direction of the substrate, wherein a susceptor ring is provided outside a periphery of a substrate setting portion of the susceptor, the susceptor ring comprising a first ring and a second ring, the first ring located outside the periphery of the substrate setting portion and supported by a sidewall portion of the reaction chamber, the second ring set on a circular step having a recessed surface, the circular step provided within an inner circumference of the first ring.

2. The epitaxial growth device according to claim 1, wherein a distance between a center of the ceiling board and a substrate setting portion of the susceptor is less than 10 mm.

3. The epitaxial growth device according to claim 1, wherein the sidewall portion of the reaction chamber has a supply passage for supplying the reactant gas into the reaction chamber, the supply passage has a wall against which the reactant gas introduced from the reactant gas-introduction unit collides, and a plurality of rectification grooves are provided in end portions of the wall along a flow direction of the reactant gas.

4. The epitaxial growth device according to claim 3, wherein the rectification grooves

are positioned to face a plurality of holes of a rectification plate provided in a line in a longitudinal direction, the rectification plate being provided at an upstream side of the supply passage.

5. The epitaxial growth device according to claim 4, wherein the holes provided in the line are formed in a plurality of areas in the rectification plate, and the rectification grooves are provided corresponding to a plurality of holes located in both of a plurality of outmost end areas of the plurality of areas.

6. The epitaxial growth device according to claim 3, wherein a plurality of centers of the respective grooves are positioned to face toward a center of the sidewall portion having a ring-like shape.

7. The epitaxial growth device according to claim 1, wherein the second ring is provided to approach a space formed between the susceptor and the first ring.

8. The epitaxial growth device according to claim 1, wherein the second ring is provided to cover a space formed between the susceptor and the first ring.

9. An epitaxial growth device comprising:

a reaction chamber defined by a sidewall portion and a bottom;

a susceptor within the sidewall portion, the susceptor having a substrate setting portion configured to support a substrate during processing, wherein a susceptor ring is provided outside a periphery of a substrate setting portion of the susceptor and within the sidewall portion, the susceptor ring comprising a first ring and a second ring, the first ring located outside the periphery of the substrate setting portion and supported by the sidewall portion, the second ring set on a circular step having a recessed surface, the circular step provided within an inner circumference of the first ring;

a ring-like support portion provided on the sidewall portion defining a circular through-hole as viewed from above, the through-hole having an inner wall with two opposing inclined face portions, each of which taper gradually toward the substrate support portion;

a light-transmissive ceiling board disposed on the inner wall of the ring-like support portion, the ceiling board defining a height between the susceptor and the ceiling board that is substantially equal across a width of the susceptor;

a first heating unit located outside of the reaction chamber for heating a substrate inside of the reaction chamber via the ceiling board;

a second heating unit located outside of the reaction chamber for heating the substrate inside of the reaction chamber via the bottom; and

a reactant gas-introduction supply passage provided in the sidewall portion for introducing a reactant gas into the reaction chamber in a direction parallel to a plane of the substrate setting portion.

10. The epitaxial growth device according to claim 9, wherein the supply passage has a wall against which the reactant gas introduced from the reactant gas-introduction unit collides.

11. The epitaxial growth device according to claim 10, wherein a plurality of rectification grooves are provided in end portions of the wall along a flow direction of the reactant gas.

12. The epitaxial growth device according to claim 9, wherein the reactant gas-introduction supply passage includes a rectification plate located in a flow path of the reactant gas.

13. The epitaxial growth device according to claim 12, wherein the rectification plate includes a plurality of holes positioned about a circumference of the susceptor.

14. The epitaxial growth device according to claim 9, wherein an exhaust passage is provided in the sidewall portion opposite the reactant gas-introduction supply passage.

15. An epitaxial growth device comprising:

a reaction chamber defined by a ring-like upper sidewall portion, a ring-like lower sidewall portion, and a bottom;

a susceptor within the reaction chamber, the susceptor having a substrate setting portion configured to support a substrate during processing, wherein a susceptor ring is provided outside a periphery of a substrate setting portion of the susceptor and within the ring-like lower sidewall portion, the susceptor ring comprising a first ring and a second ring, the first ring located outside the periphery of the substrate setting portion and supported by the ring-like lower sidewall portion, the second ring set on a recessed circular step provided within an inner circumference of the first ring;

a support portion disposed within the ring-like upper sidewall portion defining a circular through-hole as viewed from above, the support portion having two opposing inclined face portions that reduce gradually toward the substrate support portion;

a light-transmissive ceiling board disposed on one of the two opposing inclined face portions of the ring-like support portion, the ceiling board defining a height between the susceptor and the ceiling board that is substantially equal across a width of the susceptor;

a first heating unit located outside of the reaction chamber for heating a substrate inside of the reaction chamber via the ceiling board;

a second heating unit located outside of the reaction chamber for heating the substrate inside of the reaction chamber via the bottom;

a reactant gas-introduction supply passage provided in the ring-like lower sidewall portion for introducing a reactant gas into the reaction chamber in a direction parallel to a first plane of the substrate setting portion, wherein the reactant gas-introduction supply passage comprises a first supply passage disposed parallel to the first plane, and a second supply passage disposed in a second plane that is perpendicular to the first plane, wherein the ceiling board has a surface that is substantially coplanar with the first supply passage; and

an exhaust passage is provided in the ring-like lower sidewall portion opposite the reactant gas-introduction supply passage.

16. The epitaxial growth device according to claim 14, wherein the reactant gas-introduction supply passage includes a rectification plate located in a flow path of the reactant gas.

17. The epitaxial growth device according to claim 16, wherein the rectification plate includes a plurality of holes positioned about a circumference of the susceptor.

18. The epitaxial growth device according to claim 14, wherein the supply passage has a wall against which the reactant gas introduced from the reactant gas-introduction unit collides.

19. The epitaxial growth device according to claim 18, wherein a plurality of rectification grooves are provided in end portions of the wall along a flow direction of the reactant gas.

20. The epitaxial growth device according to claim 1, wherein the reactant gas-introduction supply passage comprises a plurality of first supply passages disposed parallel to the first plane, and a plurality of second supply passages disposed in a second plane that is perpendicular to the first plane, and each of the second supply passages comprise an arc-like shape that elongates in the second plane.