Claims

1. A feed-through apparatus for a chemical vapour deposition device, the feed-through apparatus comprising:

a feed-through main body;,

a plurality of runner units being provided within the feed-through main body, each runner unit comprising

a fluid inlet for receiving a fluid, and

an elongated runner in fluid communication with the fluid inlet for receiving the fluid from the fluid inlet, and the elongated runner extending spirally on a surface of the runner unit; and

a feed-through device rotatable with respect to the plurality of runner units, the feed-through device comprising a plurality of feed-through device fluid channels, each feed-through device fluid channel comprising at least one feed-through device fluid transfer orifice and at least one feed-through device fluid outlet orifice, each feed-through device fluid transfer orifice being in fluid communication with a corresponding elongated runner during rotation of the feed-through device for receiving fluid from the corresponding elongated runner, each feed-through device fluid outlet orifice being provided for releasing the fluid into a reactor chamber.

2. The feed-through apparatus according to claim 1, wherein each elongated runner is arranged as a spiral slit on a cylindrical element.

3. The feed-through apparatus according to claim 1, wherein each elongated runner is arranged as a spiral slit on a plane that is transverse to the rotational axis of the feed-through device.

4. The feed-through apparatus according to claim 1, wherein each elongated runner comprises a first end and a second end.

5. The feed-through apparatus according to claim 4, wherein the fluid inlet of each runner unit is arranged at the first end of the elongated runner.

6. The feed-through apparatus according to claim 5, wherein each runner unit further comprises another fluid inlet arranged at the second end of the elongated runner for receiving fluid.

7. The feed-through apparatus according to claim 1 further comprising a plurality of sealing devices for preventing against fluid leakages between adjacent runners and corresponding feed-through device fluid transfer orifices.

8. The feed-through apparatus according to claim 1 further comprising a spinner device being connected to the feed-through device, the spinner device comprising a plurality of blades with a plurality of blade fluid channels, each blade fluid channel comprising at least one blade fluid transfer orifice and at least one blade fluid outlet orifice, each blade fluid transfer orifice being provided for receiving fluid from a corresponding feed-through device fluid outlet orifice, and each blade fluid outlet orifice being provided for releasing the fluid into the reactor chamber.

9. The feed-through apparatus according to claim 1, wherein the feed-through device comprises an inner shaft, one end of the inner shaft is attached to the spinner device, and the other end of the inner shaft is releasably connected with the feed-through device.

10. The feed-through apparatus according to claim 9, wherein a pin and groove assembly is provided for releasably connecting the spinner device with the inner shaft.

11. The feed-through apparatus according to claim 9, wherein a groove and key assembly is provided at the inner shaft and at the feed-through device for limiting the lowering of the spinner device.

12. The feed-through apparatus according to claim 9, wherein the spinner device comprises an alignment protrusion for aligning the inner shaft to the spinner device during assembly.

13. The feed-through apparatus according to claim 1, wherein the feed-through device comprises:

- at least one first inner shaft cooling fluid channel, the inner shaft cooling fluid channel comprising at least one first inner shaft cooling fluid transfer orifice and at least one first inner shaft cooling fluid outlet orifice, wherein the first inner shaft cooling fluid transfer orifice is provided for receiving a coolant fluid, and
- at least one second inner shaft cooling fluid channel, the second inner shaft cooling fluid channel comprising at least one second inner shaft cooling fluid transfer orifice and at least one second inner shaft cooling fluid outlet orifice,

the blades of the spinner device comprises

- a plurality of first blade cooling fluid channels, each first blade cooling fluid channel comprising at least one first blade cooling fluid transfer orifice and at least one first blade cooling fluid outlet orifice, wherein each first blade cooling fluid transfer orifice is provided for receiving the coolant fluid from a corresponding first inner shaft cooling fluid outlet orifice, and
- a plurality of second blade cooling fluid channels, each second blade cooling fluid channel comprising at least one second blade cooling fluid transfer orifice and at least one second blade cooling fluid outlet orifice, and

the spinner device comprises

- a hollow ring being connected to the first blade cooling fluid outlet orifices and to the second blade cooling fluid inlet orifices, wherein the hollow ring is provided to receive the coolant fluid from the first blade cooling fluid outlet orifices and to transmit the coolant fluid to the second blade cooling fluid transfer orifices,

wherein

- each second blade cooling fluid outlet orifice is provided for transmitting the coolant fluid to a corresponding second inner shaft cooling fluid transfer orifice, and
- the second inner shaft cooling fluid outlet orifice is provided for releasing the coolant fluid.

14. The feed-through apparatus according to claim 13, wherein the hollow ring is connected to outer end parts of the blades.

15. A chemical vapour deposition device comprising:

a chemical reaction chamber;

a table with at least one chuck for receiving at least one semiconductor wafer, the table being provided in the chemical reaction chamber; and

a feed-through apparatus according to one of the above-mentioned items, wherein the feed-through apparatus is connected with the chemical reaction chamber.

Allowed Claims

1. A feed-through apparatus for a chemical vapour deposition device, the feed-through apparatus comprising:

a feed-through main body;,

a plurality of runner units being provided within the feed-through main body, each runner unit comprising

a fluid inlet for receiving a fluid, and

an elongated runner in fluid communication with the fluid inlet that is operative to receive the fluid from the fluid inlet, and the elongated runner extending spirally on a surface of the runner unit; and

a feed-through device rotatable with respect to the plurality of runner units, the feed-through device comprising a plurality of feed-through device fluid channels, each feed-through device fluid channel comprising at least one feed-through device fluid transfer orifice and at least one feed-through device fluid outlet orifice, each feed-through device fluid transfer orifice being in fluid communication with a corresponding elongated runner during rotation of the feed-through device that is operative to receive fluid from the corresponding elongated runner, each feed-through device fluid outlet orifice being provided for releasing the fluid into a reactor chamber;

wherein the elongated runner is operative to receive fluid from the fluid inlet and to transport the fluid to the feed-through device through the elongated runner.

2. The feed-through apparatus according to claim 1, wherein each elongated runner is arranged as a spiral slit on a cylindrical element.

3. The feed-through apparatus according to claim 1 or claim 2, wherein each elongated runner is arranged as a spiral slit on a plane that is transverse to the rotational axis of the feed-through device.

4. The feed-through apparatus according to any one of the preceding claims, wherein each elongated runner comprises a first end and a second end.

5. The feed-through apparatus according to claim 4, wherein the fluid inlet of each runner unit is arranged at the first end of the elongated runner.

6. The feed-through apparatus according to claim 5, wherein each runner unit further comprises another fluid inlet arranged at the second end of the elongated runner for receiving fluid.

7. The feed-through apparatus according to any one of the preceding claims further comprising a plurality of sealing devices for preventing against fluid leakages between adjacent runner units and corresponding feed-through device fluid transfer orifices.

8. The feed-through apparatus according to any one of the preceding claims further comprising a spinner device being connected to the feed-through device, the spinner device comprising a plurality of blades with a plurality of blade fluid channels, each blade fluid channel comprising at least one blade fluid transfer orifice and at least one blade fluid outlet orifice, each blade fluid transfer orifice being provided for receiving fluid from a corresponding feed-through device fluid outlet orifice, and each blade fluid outlet orifice being provided for releasing the fluid into the reactor chamber.

9. The feed-through apparatus according to claim 8, wherein the feed-through device comprises an inner shaft, one end of the inner shaft is attached to the spinner device, and the other end of the inner shaft is releasably connected with the feed-through device.

10. The feed-through apparatus according to claim 9, wherein a pin and groove assembly is provided for releasably connecting the spinner device with the inner shaft.

11. The feed-through apparatus according to claim 9 or claim 10, wherein a groove and key assembly is provided at the inner shaft and at the feed-through device for limiting the lowering of the spinner device.

12. The feed-through apparatus according to any one of claims 9 to 11, wherein the spinner device comprises an alignment protrusion for aligning the inner shaft to the spinner device during assembly.

13. The feed-through apparatus according to any one of claims 8 to 12, wherein the feed-through device further comprises:

- at least one first inner shaft cooling fluid channel, the inner shaft cooling fluid channel comprising at least one first inner shaft cooling fluid transfer orifice and at least one first inner shaft cooling fluid outlet orifice, wherein the first inner shaft cooling fluid transfer orifice is provided for receiving a coolant fluid, and
- at least one second inner shaft cooling fluid channel, the second inner shaft cooling fluid channel comprising at least one second inner shaft cooling fluid transfer orifice and at least one second inner shaft cooling fluid outlet orifice,

the blades of the spinner device comprises

- a plurality of first blade cooling fluid channels, each first blade cooling fluid channel comprising at least one first blade cooling fluid transfer orifice and at least one first blade cooling fluid outlet orifice, wherein each first blade cooling fluid transfer orifice is provided for receiving the coolant fluid from a corresponding first inner shaft cooling fluid outlet orifice, and
- a plurality of second blade cooling fluid channels, each second blade cooling fluid channel comprising at least one second blade cooling fluid transfer orifice and at least one second blade cooling fluid outlet orifice, and

the spinner device further comprises

- a hollow ring being connected to the first blade cooling fluid outlet orifices and to the second blade cooling fluid transfer orifices, wherein the hollow ring is provided to receive the coolant fluid from the first blade cooling fluid outlet orifices and to transmit the coolant fluid to the second blade cooling fluid transfer orifices,

wherein

- each second blade cooling fluid outlet orifice is provided for transmitting the coolant fluid to a corresponding second inner shaft cooling fluid transfer orifice, and

- the second inner shaft cooling fluid outlet orifice is provided for releasing the coolant fluid.

14. The feed-through apparatus according to claim 13, wherein the hollow ring is connected to outer end parts of the blades.

15. A chemical vapour deposition device comprising:

a chemical reaction chamber;

a table with at least one chuck for receiving at least one semiconductor wafer, the table being provided in the chemical reaction chamber; and

a feed-through apparatus according to any one of the above-mentioned claims, wherein the feed-through apparatus is connected with the chemical reaction chamber.