

What is claimed is:

1. A backside gas delivery assembly, comprising:
a first gas channel disposed in a stem of a substrate support assembly, the substrate support assembly comprising a substrate support having a second gas channel extending from the first gas channel; and
a porous plug disposed within the first gas channel positioned at an interface of the stem and the substrate support.
2. The backside gas delivery assembly of claim 1, further comprising a gas source connected to the first gas channel.
3. The backside gas delivery assembly of claim 1, wherein the backside gas delivery assembly is configured to deliver an inert gas to a backside surface of a substrate disposed on an upper surface of the substrate support.
4. The backside gas delivery assembly of claim 1, wherein the first gas channel extends through a RF gasket.
5. The backside gas delivery assembly of claim 4, wherein the RF gasket is connected to an electrical ground.
6. The backside gas delivery assembly of claim 5, further comprising a gas tube in the first gas channel extending to the porous plug positioned at the interface of the stem and the substrate support.
7. The backside gas delivery assembly of claim 6, wherein the gas tube is connected to an electrical ground.
8. The backside gas delivery assembly of claim 6, wherein the gas tube is bonded an inner surface of the first gas channel.

9. The backside gas delivery assembly of claim 6, wherein the gas tube is welded to a first portion of the first gas channel positioned before the RF gasket.

10. The backside gas delivery assembly of claim 6, wherein the gas tube has an inner diameter between about 0.025 inches and 0.075 inches.

11. The backside gas delivery assembly of claim 10, wherein an inner surface of the gas tube has a surface finish of less than 5 microinches (μin).

12. The backside gas delivery assembly of claim 11, wherein the gas tube is formed from electroformed nickel.

13. A backside gas delivery assembly, comprising:

a first gas channel disposed in a stem of a substrate support assembly, the substrate support assembly comprising a substrate support having a second gas channel extending from the first gas channel;

a porous plug disposed within the first gas channel positioned at an interface of the stem and the substrate support;

a gas source connected to the first gas channel configured to deliver an inert gas to a backside surface of a substrate disposed on an upper surface of the substrate support; and

a gas tube in the first gas channel extending to the porous plug positioned at the interface of the stem and the substrate support.

14. The backside gas delivery assembly of claim 13, wherein the first gas channel extends through a RF gasket connected to an electrical ground and the gas tube is connected to the electrical ground.

15. A backside gas delivery assembly, comprising:

a first gas channel disposed in a stem of a substrate support assembly, the substrate support assembly comprising a substrate support having a second gas channel extending from the first gas channel;

a porous plug disposed within the first gas channel positioned at an interface of the stem and the substrate support;

a gas source connected to the first gas channel configured to deliver an inert gas to a backside surface of a substrate disposed on an upper surface of the substrate support; and

a gas tube connected to an electrical ground having an inner diameter between about 0.025 inches and 0.075 inches and an inner surface having a surface finish less than 5 microinches, the gas tube bonded to the first gas channel and extending to the porous plug positioned at the interface of the stem and the substrate support.