We Claim:

1. A chamber, comprising:

a chamber body;

a substrate support disposed with the chamber body, the substrate support having a plurality of zones which may be independently heated to heat a substrate positioned on the substrate support; and

a chamber lid disposed on the chamber body, the chamber lid comprising:

a lid body comprising aluminum, the lid body having a circular opening disposed therethrough;

a reflector plate positioned within the circular opening and having a surface adjacent to an upper surface of the substrate support; and

a plurality of pyrometers disposed through openings formed in the reflector plate to measure a temperature of the substrate a plurality of locations across a surface of the substrate, wherein each pyrometer of the plurality of pyrometers corresponds to each zone of the plurality of zones.

2. The chamber of claim 1, wherein the substrate support comprises a plurality of independently-controllable resistive heating elements that are adjusted in response to temperatures measured by the plurality of pyrometers.

3. The chamber of claim 1, wherein the plurality of zones comprises a first zone having a circular shape centrally disposed on the substrate support, and a second zone circumscribing the first zone.

4. The chamber of claim 3, wherein the plurality of zones further comprises a third zone, a fourth zone, and fifth zone, and a sixth zone, and wherein the third zone, the fourth zone, the fifth zone, and the sixth zone are disposed radially outward of the second zone.

5. The chamber of claim 4, wherein the third zone, the fourth zone, the fifth zone, and the sixth zone each extend around about 90 degrees of the circumference of the substrate support.

6. The chamber of claim 1, wherein the chamber body further comprises a thermally insulating liner disposed on an interior surface thereof and a fluid passage formed therein for containing a temperature controlling fluid.

7. A chamber, comprising:

a chamber body comprising aluminum;

a substrate support disposed within the chamber body, the substrate support having a plurality of zones which may be independently heated to heat a substrate positioned on the substrate support; and

a chamber lid disposed on the chamber body, the chamber lid comprising:

a lid body comprising aluminum, the lid body having a circular opening disposed therethrough;

a reflector plate positioned within the circular opening and having a surface adjacent to an upper surface of the substrate support; and

a plurality of pyrometers disposed through openings formed in the reflector plate to measure a temperature of the substrate at a plurality of locations across a surface of the substrate, wherein each pyrometer of the plurality of pyrometers corresponds to one of the zones of the plurality of zones.

8. The chamber of claim 7, wherein the plurality of zones comprise a first zone having a circular shape centrally disposed on the substrate support, and a second zone circumscribing the first zone.

9. The chamber of claim 8, wherein the plurality of zones further comprises a third zone, a fourth zone, and fifth zone, and a sixth zone, and wherein the third zone, the fourth zone, the fifth zone, and the sixth zone are disposed radially outward of the second zone.

10. The chamber of claim 9, wherein the substrate support comprises a plurality of independently-controllable resistive heating elements.

11. The chamber of claim 10, wherein the plurality of independently-controllable resistive heating elements are adjusted in response to temperatures measured by the plurality of pyrometers, and wherein the chamber body further comprises a thermally insulating liner disposed on an interior surface thereof.

12. A chamber, comprising:

a chamber body comprising aluminum;

a substrate support disposed with the chamber body, the substrate support having a plurality of zones which may be independently heated to heat a substrate positioned on the substrate support, wherein each zone of the plurality of zones comprises a resistive heating element;

a chamber lid disposed on the chamber body, the chamber lid comprising:

a lid body comprising aluminum, the lid body having a circular opening disposed therethrough;

a reflector plate positioned within the circular opening and having a surface adjacent to an upper surface of the substrate support; and

a plurality of pyrometers disposed through openings formed in the reflector plate to measure a temperature of the substrate a plurality of locations across a surface of the substrate, wherein each pyrometer of the plurality of pyrometers corresponds to one of the zones of the plurality of zones; and

a controller coupled to the resistive heating element of each zone and to the plurality of pyrometers, the controller adapted to control an amount of power applied to the resistive heating element of each zone based on a signal from each of the plurality of pyrometers.

13. The chamber of claim 12, wherein the plurality of zones comprise a first zone having a circular shape centrally disposed on the substrate support, and a second zone circumscribing the first zone.

14. The chamber of claim 13, wherein the plurality of zones further comprises a third zone, a fourth zone, and fifth zone, and a sixth zone, and wherein the third zone, the fourth zone, the fifth zone, and the sixth zone are disposed radially outward of the second zone.

15. The chamber of claim 14, wherein the third zone, the fourth zone, the fifth zone, and the sixth zone each extend around about 90 degrees of the circumference of the substrate support, and wherein the substrate support is formed from aluminum and the resistive heating elements comprise molybdenum.

Claims

1. A chamber, comprising:

a chamber body;

a substrate support disposed within the chamber body, the substrate support having a plurality of zones which are adapted to be independently heated to heat a substrate positioned on the substrate support, wherein a resistive heating element is disposed in each zone of the plurality of zones; and

a chamber lid disposed on the chamber body, the chamber lid comprising:

a lid body comprising aluminum, the lid body having a circular opening disposed therethrough;

a reflector plate positioned within the circular opening and having a surface adjacent to an upper surface of the substrate support, the reflector plate having a first section with a first diameter and a second section with a second diameter smaller than the first diameter; and

a plurality of pyrometers disposed through openings formed in the reflector plate to measure a temperature of the substrate a plurality of locations across a surface of the substrate, wherein each pyrometer of the plurality of pyrometers corresponds to each zone of the plurality of zones.

2. The chamber of claim 1, wherein the resistive heating elements are controlled by the plurality of pyrometers.

3. The chamber of claim 1, wherein the plurality of zones comprises a first zone having a circular shape centrally disposed on the substrate support, and a second zone circumscribing the first zone.

4. The chamber of claim 3, wherein the plurality of zones further comprises a third zone, a fourth zone, and fifth zone, and a sixth zone, and wherein the third zone, the fourth zone, the fifth zone, and the sixth zone are disposed radially outward of the second zone.

5. The chamber of claim 4, wherein the third zone, the fourth zone, the fifth zone, and the sixth zone each extend around about 90 degrees of the circumference of the substrate support.

6. The chamber of claim 1, wherein the chamber body further comprises a thermally insulating liner disposed on an interior surface thereof and a fluid passage formed therein for containing a temperature controlling fluid.

7. A chamber, comprising:

a chamber body comprising aluminum;

a support shaft disposed within the chamber body;

a substrate support disposed within the chamber body and coupled to an upper surface of the support shaft, the substrate support having a plurality of zones which are adapted to be independently heated to heat a substrate positioned on the substrate support, wherein a resistive heating element is disposed in each zone of the plurality of zones; and

a chamber lid disposed on the chamber body, the chamber lid comprising:

a lid body comprising aluminum, the lid body having a circular opening disposed therethrough;

a reflector plate positioned within the circular opening and having a surface adjacent to an upper surface of the substrate support, the reflector plate having a first section with a first diameter and a second section with a second diameter smaller than the first diameter, the first section of the reflector plate positioned on an upper surface of the lid body to support the reflector plate within the circular opening; and

a plurality of pyrometers disposed through openings formed in the reflector plate to measure a temperature of the substrate at a plurality of locations across a surface of the substrate, wherein each pyrometer of the plurality of pyrometers corresponds to one of the zones of the plurality of zones.

8. The chamber of claim 7, wherein the plurality of zones comprise a first zone having a circular shape centrally disposed on the substrate support, and a second zone circumscribing the first zone.

9. The chamber of claim 8, wherein the plurality of zones further comprises a third zone, a fourth zone, and fifth zone, and a sixth zone, and wherein the third zone, the fourth zone, the fifth zone, and the sixth zone are disposed radially outward of the second zone.

10. The chamber of claim 9, wherein the plurality of independently-controllable resistive heating elements are adjusted in response to temperatures measured by the plurality of pyrometers.

11. The chamber of claim 10, wherein the chamber body further comprises a thermally insulating liner disposed on an interior surface thereof.

12. A chamber, comprising:

a chamber body comprising aluminum;

a substrate support disposed with the chamber body, the substrate support having a plurality of zones which are adapted to be independently heated to heat a substrate positioned on the substrate support, wherein each zone of the plurality of zones comprises a resistive heating element;

a chamber lid disposed on the chamber body, the chamber lid comprising:

a lid body comprising aluminum, the lid body having a circular opening disposed therethrough;

a reflector plate positioned within the circular opening and having a surface adjacent to an upper surface of the substrate support, the reflector plate having a first section with a first diameter and a second section with a second diameter smaller than the first diameter, the first section of the reflector plate positioned on an upper surface of the lid body to support the reflector plate within the circular opening; and

a plurality of pyrometers disposed through openings formed in the reflector plate to measure a temperature of the substrate a plurality of locations across a surface of the substrate, wherein each pyrometer of the plurality of pyrometers corresponds to one of the zones of the plurality of zones; and

a controller coupled to the resistive heating element of each zone and to the plurality of pyrometers, the controller adapted to control an amount of power applied to the resistive heating element of each zone based on a signal from each of the plurality of pyrometers.

13. The chamber of claim 12, wherein the plurality of zones comprise a first zone having a circular shape centrally disposed on the substrate support, and a second zone circumscribing the first zone.

14. The chamber of claim 13, wherein the plurality of zones further comprises a third zone, a fourth zone, and fifth zone, and a sixth zone, and wherein the third zone, the fourth zone, the fifth zone, and the sixth zone are disposed radially outward of the second zone.

15. The chamber of claim 14, wherein the third zone, the fourth zone, the fifth zone, and the sixth zone each extend around about 90 degrees of the circumference of the substrate support.

16. The chamber of claim 15, wherein the substrate support is formed from aluminum.

17. The chamber of claim 16, wherein the resistive heating elements comprise molybdenum.

18. The chamber of claim 12, further comprising a plurality of lift pins disposed through the substrate support, the lift pins adapted to contact a lift plate positioned within the chamber body.

19. The chamber of claim 1, further comprising a plurality of lift pins disposed through the substrate support, the lift pins adapted to contact a lift plate positioned within the chamber body.