Claims

1. A semiconductor processing chamber comprising:

a body having an ceiling and lower portion defining an interior volume;

a substrate support disposed in the interior volume;

a movement assembly above the ceiling outside the interior volume; and

a sensor coupled to the movement assembly and rotatable relative to the ceiling, the sensor configured to detect a temperature location in the interior volume.

2. The semiconductor processing chamber of claim 1, wherein the sensor is configured to detect through a window in the ceiling a temperature of the lower portion of the body and the substrate support.

3. The semiconductor processing chamber of claim 2, wherein the movement assembly further comprises:

a mounting plate, the mounting plate coupling the movement assembly to the ceiling;

a linear rail coupled to the mounting plate; and

a rotational stage configured to ride along the rail, wherein the sensor is mounted to the rotational stage and the rotational stage is configured to rotate the sensor relative to the ceiling.

4. The semiconductor processing chamber of claim 3, wherein the substrate support is configured to rotate and the movement assembly is configured to move the sensor, and wherein the sensor has a spiral read path for the temperature locations along the substrate support.

5. The semiconductor processing chamber of claim 4, wherein the stage is configured to rotate.

6. The semiconductor processing chamber of claim 3, wherein the sensor is a pyrometer.

7. The semiconductor processing chamber of claim 2, wherein the movement assembly further comprises:

a mounting plate, the mounting plate coupling the movement assembly to the ceiling;

a rotational stage attached to mounting plate; and

a gimbal mount attached to the rotational stage, the sensor mounted to the gimbal mount, wherein the rotational stage and gimbal mount provide the sensor with two degrees of rotation.

8. The semiconductor processing chamber of claim 7, wherein the sensor can be rotated to detect a first temperature of the lower portion of the body and a second temperature of the a substrate support.

9. The semiconductor processing chamber of claim 8, wherein the sensor is a pyrometer.

10. A sensor assembly for an epitaxy processing chamber, the sensor assembly comprising:

a movement assembly coupled to a mounting plate disposed outside the epitaxy processing chamber; and

a sensor coupled to the movement assembly, the sensor configured to detect a temperature location in an interior volume of the epitaxy processing chamber, wherein the sensor is rotatable relative to the epitaxy processing chamber in generating a temperature map of the interior volume of the epitaxy processing chamber.

11. The sensor assembly of claim 10, wherein the movement assembly further comprises:

a rotational stage attached to the mounting plate; and

a gimbal mount attached to the rotational stage, the sensor mounted to the gimbal mount, wherein the rotational stage and gimbal mount provide the sensor with two degrees of rotation.

12. The sensor assembly of claim 11, wherein the sensor is a pyrometer.

13. The sensor assembly of claim 11, wherein the movement assembly further comprises:

a linear rail coupling the mounting plate to the rotational stage, wherein

the rotational stage is configured to ride along the rail.

14. A method for mapping a temperature of a substrate in a processing chamber, the method comprising:

placing a substrate on a substrate support assembly within a processing chamber, wherein the processing chamber has a ceiling disposed above the substrate support;

detecting the temperature of the substrate with a sensor disposed above the ceiling of the processing chamber;

moving the sensor in a rotating manner about an axis relative to the ceiling to sense the substrate with a plurality of temperature readings; and

generating a temperature map of the substrate with the plurality of temperature readings.

15. The method of claim 14 wherein moving the sensor relative to the ceiling further comprises:

moving the sensor along a linear rail coupled to a rotational stage and the ceiling.

16. The method of claim 14 wherein moving the sensor relative to the ceiling further comprises:

rotating a rotational stage supporting the sensor wherein the stage is rotational coupled to the ceiling.

17. The method of claim 14 wherein moving the sensor relative to the ceiling further comprises:

linearly moving a stage along a linear rail coupled to the ceiling;

rotating a rotational stage supporting the sensor wherein the stage is coupled to the linear rail; and

pivoting the sensor relative to the stage supporting the sensor.

18. The method of claim 14 further comprising:

comparing a calculated and measured temperature locations in the temperature map to a map of acceptable temperature; and

sending a message in determination that the temperature map has sample or calculated locations outside of acceptable ranges.

19. The method of claim 14 further comprising:

utilizing the temperature map in a machine learning algorithm to identify fault scenarios; and

scheduling a relevant event based on the identified fault.