CLAIMS

What is claimed is:

1. A system for monitoring a semiconductor processes, comprising:

a plurality of sensors selectively arranged within a process chamber and configured to issue process signals indicative of a material process occurring proximal to each of the plurality of sensors, a first sensor defining a first spatial position within the process chamber and a second sensor defining a second spatial position within the process chamber, the first and second spatial positions being fixed relative to the process chamber, and wherein the first spatial position comprises a different angular orientation than the second spatial position, and,

a microcontroller, responsive to the process signals, for correlating the material process sensed by the first and second sensors with a semiconductor process occurring within a current process chamber to acquire information useful for conducting semiconductor processes performed within one of a current process chamber and a related process chamber.

2. The system of claim 1 wherein the semiconductor process pertains to a deposition or removal process from a substrate.

3. The system of claim 1 wherein the semiconductor process pertains to a material thickness profile of a substrate.

4. The system of claim 3 wherein the microcontroller determines a uniformity of the material thickness profile.

5. The system of claim 1 wherein process signals issued by at least two sensors are correlated to acquire information regarding semiconductor processes occurring in a region between the at least two sensors.

6. The system of claim 1 wherein the plurality of sensors are disposed about an edge of a substrate and wherein the microcontroller controls a semiconductor process to maintain substrate edge uniformity.

7. The system of claim 1 wherein a substrate within the process chamber defines a two dimensional plane, wherein at least one of the first and second sensors are misaligned with respect to the two dimensional plane, and wherein the microcontroller develops three dimensional, thickness profile data in connection with the substrate.

8. The system of claim 1, wherein the plurality of sensors comprise Quartz Crystal Microbalance (QCM) sensors.

9. The system of claim 1, wherein the plurality of sensors comprise microelectromechanical (MEM) sensors.

10. The system of claim 1, wherein the plurality of sensors comprise one or more of Quartz Crystal Microbalance (QCM) sensors an microelectromechanical (MEM) sensors.

11. A system for monitoring a semiconductor process, the system comprising:

a plurality of sensors disposed within a process chamber, the plurality of sensors being configured to monitor a deposition or a removal process at different locations within the process chamber, wherein a first sensor of the plurality of sensors has a first angular orientation and a first position in the process chamber and a second sensor of the plurality of sensors has a second angular orientation and second position in the process chamber, wherein the first position and the second position are fixed relative to the process chamber; and

a microcontroller for receiving data from the plurality of sensors, wherein the microcontroller measures uniformity of the semiconductor process based on the data received from the plurality of sensors, wherein the first angular orientation and first position of the first sensor and the second angular orientation and second position of the second sensor facilitates measuring the uniformity of the semiconductor processes.

12. The system of claim 11, wherein the plurality of sensors comprises Quartz Crystal Microbalance (QCM) sensors.

13. The system of claim 11, wherein the plurality of sensors comprise microelectromechanical (MEM) sensors.

14. The system of claim 11, wherein the plurality of sensors comprise one or more of Quartz Crystal Microbalance (QCM) sensors an microelectromechanical (MEM) sensors.

15. The system of claim 11, wherein the semiconductor process is a material deposition process and the microcontroller measures uniformity of material deposition in the chamber.

16. The system of claim 11, wherein the semiconductor process comprises a material deposition process and the microcontroller measures a material thickness in the chamber.

17. The system of claim 11, wherein the semiconductor process comprises a material removal process and the microcontroller measures uniformity of material removal in the chamber.

18. The system of claim 11, wherein the semiconductor process comprises a material removal process and the microcontroller measures a material thickness in the chamber.

19. A method for monitoring a semiconductor process, the method comprising:

providing a plurality of sensors within a process chamber, a first sensor of the plurality of sensors having a first angular orientation and a first position in the process chamber and a second sensor of the plurality of sensors having a second angular orientation and second position in the process chamber, wherein the first position and the second position are fixed relative to the process chamber;

monitoring a deposition or a removal process at different locations within the process chamber; and

measuring uniformity of the semiconductor process based on data received from the plurality of sensors during the monitoring step, wherein the first angular orientation and first position of the first sensor and the second angular orientation and second position of the second sensor facilitates measuring the uniformity of the semiconductor processes.

20. The method of claim 19, wherein the plurality of sensors comprise a plurality of Quartz Crystal Microbalance (QCM) sensors.

21. The method of claim 19, wherein the plurality of sensors comprises microelectromechanical (MEM) sensors.

22. The method of claim 19, wherein the plurality of sensors comprise one or more of Quartz Crystal Microbalance (QCM) sensors an microelectromechanical (MEM) sensors.

23. The method of claim 19, wherein the semiconductor process is a material deposition process and a microcontroller measures uniformity of material deposition in the chamber.

24. The method of claim 19, wherein the semiconductor process is a material deposition process and a microcontroller measures a material thickness in the chamber.

25. The method of claim 19, wherein the semiconductor process is a material removal process and a microcontroller measures uniformity of material removal in the chamber.

26. The method of claim 19, wherein the semiconductor process is a material removal process and a microcontroller measures a material thickness in the chamber.

~~27. A method for monitoring semiconductor processes in a process chamber, the method comprising the steps of:~~

~~providing a baseline substrate having thickness profile which meets an acceptance profile;~~

~~placing a plurality of sensors within a process chamber to measure material process data occurring proximal to each of the plurality of sensors, a first sensor defining a first spatial position within the process chamber and a second sensor defining a second spatial position within the process chamber, wherein the first and second spatial position are fixed relative to~~

~~the process chamber and wherein the first spatial position having a different angular orientation than the second spatial position;~~

~~correlating the measured material process data with a thickness profile of a test substrate produced within the process chamber;~~

~~comparing the thickness profile of the test substrate with the baseline substrate to determine whether the test substrate is satisfied by an acceptance criteria established by the acceptance profile of the baseline substrate and recording the measured material process data of the sensors when the acceptance criteria of the test substrate has been satisfied; and~~

~~processing a subsequently fabricated substrate in accordance with the recorded material process data.~~

~~28. The method of claim 27 wherein the substrate within the process chamber defines a two dimensional plane, wherein at least one of the first and second sensors are misaligned with respect to the two dimensional plane, and wherein a microcontroller develops three dimensional, thickness profile data in connection with the substrate.~~

~~29. The method of claim 27 further comprising the steps of dynamically mounting at least one sensor of the plurality of sensors to reposition the at least one sensor from an initial to an final position; measuring the material process data of the at least one sensor in the initial and final positions, and correlating the measured material process data with the thickness profile of the test substrate.~~