CLAIMS

1. An optical sensor system suitable for measuring a process condition or a chamber condition within a chamber interior volume of a plasma processing chamber, the optical sensor system comprising:

a housing, wherein the housing is suitable for extending through a chamber wall of the plasma processing chamber and into the chamber interior volume of the plasma processing chamber;

an optical path through the housing, wherein the optical path comprises a first end and a second end;

a reflector at the first end of the optical path, wherein a reflector surface of the reflector is configured to be positioned within the chamber interior volume and is configured to be exposed to a processing environment of the chamber interior volume;

an opening through the housing between the second end of the optical path and the reflector, wherein the opening provides an unobstructed path through the housing;

a light source optically coupled to the optical path, wherein the light source is a broad band light source; and

a sensor optically coupled to the optical path, wherein the sensor is configured to be positioned outside of the chamber interior volume and is configured to not be exposed to the processing environment of the chamber interior volume.

2. The optical sensor system of claim 1, wherein the light source and the sensor are optically coupled to the optical path by a fiber optic cable.

3. The optical sensor system of claim 2, wherein the fiber optic cable comprises a splitter.

4. The optical sensor system of claim 1, further comprising:

a band pass filter at a location along an optical path between the sensor and the opening.

5. The optical sensor system of claim 1, wherein the sensor is a spectrometer or a photodiode.

6. The optical sensor system of claim 1, wherein the light source and the sensor are integrated into the housing.

7. The optical sensor system of claim 1, wherein the housing is transparent.

8. The optical sensor system of claim 1, wherein the reflector is removable.

9. The optical sensor system of claim 1, wherein the reflector surface is selected to substantially match a deposition on an interior surface of the chamber wall.

10. A plasma processing chamber including a chamber wall with a perimeter, a chamber interior volume, and an optical sensing array,

(a) wherein the optical sensing array includes a plurality of optical sensor systems oriented around the perimeter of the chamber wall;

(b) wherein each optical sensor system comprises:

a housing, wherein the housing extends through the chamber wall and into the chamber interior volume;

an optical path through the housing, wherein the optical path comprises a first end and a second end;

a reflector at the first end of the optical path, wherein a reflector surface of the reflector is positioned within the chamber interior volume and is exposed to a processing environment of the chamber interior volume;

an opening through the housing between the second end of the optical path and the reflector, wherein the opening provides an unobstructed path through the housing;

a light source optically coupled to the optical path, wherein the light source is a broad band light source; and

a sensor optically coupled to the optical path, wherein the sensor is positioned outside of the chamber interior volume and is not exposed to the processing environment of the chamber interior volume; and

(c) wherein each optical sensor system is suitable for measuring a process condition or a chamber condition within the chamber interior volume.

11. The plasma processing chamber of claim 10, wherein the plurality of optical sensing systems are configured to provide uniformity data of a plasma condition, a wall condition, or a plasma condition and a wall condition.

12. The plasma processing chamber of claim 10, wherein the plurality of optical sensing systems are configured to provide chamber drift monitoring.

13. The plasma processing chamber of claim 10, wherein the reflector surface is selected to substantially match a deposition on an interior surface of the chamber wall.