CLAIMS

1. A method for etching a layer, comprising:

providing a substrate in a chamber;

generating an etch plasma for etching a layer on the substrate;

measuring light from a first region of the chamber to provide a first signal;

measuring light from a second region of the chamber to provide a second signal; and

comparing the first signal with the second signal to determine an etch endpoint,

wherein the comparing the first signal with the second signal to determine an etch endpoint indicates a spike in nitrogen in the first region.

2. The method, as recited in claim 1, further comprising proceeding to a next process step after determining the etch endpoint has been reached.

3. The method, as recite in 1, wherein the first region is closer to the substrate than the second region.

4. The method, as recited in claim 1, wherein the plasma is generated within a plasma region in the chamber, and wherein the first region and second region pass into the plasma region.

5. The method, as recited in claim 1, wherein the first signal provides emission spectrum data from the first region and the second signal provides emission spectrum data from the second region.

6. The method, as recited in claim 1, further comprising providing light from a light source into the first region and the second region.

7. The method, as recited in claim 1, wherein the first signal provides absorption spectrum data from the first region and the second signal provides absorption spectrum data from the second region.

8. The method, as recited in claim 1, wherein the comparing the first signal with the second signal compares an intensity of the first signal at a wavelength with an intensity of the second signal at the wavelength.

9. The method, as recited in claim 1, wherein the comparing the first signal with the second signal compares an intensity of the first signal at a wavelength range with an intensity of the second signal at the wavelength range.

10. The method, as recited in claim 1, wherein the comparing the first signal with the second signal compares an intensity of the first signal at a first wavelength with an intensity of the second signal at a second wavelength.

11. The method, as recited in claim 1, wherein the comparing the first signal and the second signal comprises measuring a differential or ratio between the first signal and the second signal.

12. The method, as recited in claim 11, wherein the first comparing the first signal and the second signal further comprises normalizing the first signal and normalizing the second signal before measuring the differential between the first signal and the second signal.

13. An apparatus for etching an etch layer, comprising:

a plasma processing chamber, comprising:

a chamber wall forming a plasma processing chamber enclosure;

a substrate support for supporting a wafer within the plasma processing chamber enclosure;

a pressure regulator for regulating the pressure in the plasma processing chamber enclosure;

at least one electrode for providing power to the plasma processing chamber enclosure for sustaining a plasma;

a first light sensor for detecting light from a first region of the plasma processing chamber;

a second light sensor for detecting light from a second region of the plasma processing chamber;

a gas inlet for providing gas into the plasma processing chamber enclosure;

a gas outlet for exhausting gas from the plasma processing chamber enclosure;

at least one RF power source electrically connected to the at least one electrode;

a gas source in fluid connection with the gas inlet;

at least one processor; and computer readable media, comprising:

computer readable code for flowing an etch gas from the gas source into the plasma processing chamber;

computer readable code for forming a plasma from the etch gas;

computer readable code for comparing a first signal from the first light sensor with a second signal from the second light sensor to determine when an etch stop has been reached, wherein the comparing the first signal with the second signal to determine an etch endpoint indicates a spike in nitrogen in the first region or wherein the comparison of the first signal and the second signal indicates that CN from a SiN etch stop layer is present in the first region; and

computer readable code for going to a next process after determining that an etch stop has been reached.

14. The apparatus, as recited in claim 13, wherein the plasma processing chamber further comprises a light source positioned to provide light to the first light sensor and the second light sensor.

15. The apparatus, as recited in claim 13, wherein the first region is closer to the substrate support than the second region.

16. The apparatus, as recited in claim 13, wherein the first region and the second region do not include the substrate support.

17. A method for etching a layer, comprising:

providing a substrate in a chamber;

generating an etch plasma for etching a layer on the substrate;

measuring light from a first region of the chamber to provide a first signal;

measuring light from a second region of the chamber to provide a second signal; and

comparing the first signal with the second signal to determine an etch endpoint,

wherein the comparison of light measured from a first region of the chamber to provide a first signal and light measured from a second region of the chamber to provide a second signal indicates that CN from a SiN etch stop layer is present in the first region.

18. The method, as recited in claim 17, wherein the comparing the first signal and the second signal comprises measuring a differential or ratio between the first signal and the second signal.

19. The method, as recited in claim 17, wherein the first comparing the first signal and the second signal further comprises normalizing the first signal and normalizing the second signal before measuring the differential between the first signal and the second signal.

20. The method, as recite in 17, wherein the first region is closer to the substrate than the second region.

CLAIMS

What is claimed is:

1. A method for etching a layer, comprising:
providing a substrate in a chamber;
generating an etch plasma for etching a layer on the substrate;
measuring light from a first region of the chamber to provide a first signal;
measuring light from a second region of the chamber to provide a second signal; and
comparing the first signal with the second signal to determine an etch endpoint.

2. The method, as recited in claim 1, wherein the comparing the first signal and the second signal comprises measuring a differential or ratio between the first signal and the second signal.

3. The method, as recited in claim 2, further comprising proceeding to a next process step after determining the etch endpoint has been reached.

4. The method, as recited in claim 3, wherein the first comparing the first signal and the second signal further comprises normalizing the first signal and normalizing the second signal before measuring the differential between the first signal and the second signal.

5. The method, as recite in 4, wherein the first region is closer to the substrate than the second region.

6. The method, as recited in claim 5, wherein the plasma is generated within a plasma region in the chamber, wherein the first region and second region pass into the plasma region.

7. The method, as recited in claim 6, wherein the first signal provides emission spectrum data from the first region and the second signal provides emission spectrum data from the second region.

8. The method, as recited in claim 6, further comprising providing light from a light source into the first region and the second region.

9. The method, as recited in claim 8, wherein the first signal provides absorption spectrum data from the first region and the second signal provides absorption spectrum data from the second region.

10. The method, as recited in claim 6, wherein the comparing the first signal with the second signal compares an intensity of the first signal at a wavelength with an intensity of the second signal at the wavelength.

11. The method, as recited in claim 6, wherein the comparing the first signal with the second signal compares an intensity of the first signal at a wavelength range with an intensity of the second signal at the wavelength range.

12. The method, as recited in claim 6, wherein the comparing the first signal with the second signal compares an intensity of the first signal at a first wavelength with an intensity of the second signal at a second wavelength.

13. An apparatus for etching an etch layer, comprising:

a plasma processing chamber, comprising:

a chamber wall forming a plasma processing chamber enclosure;

a substrate support for supporting a wafer within the plasma processing chamber enclosure;

a pressure regulator for regulating the pressure in the plasma processing chamber enclosure;

at least one electrode for providing power to the plasma processing chamber enclosure for sustaining a plasma;

a first light sensor for detecting light from a first region of the plasma processing chamber;

a second light sensor for detecting light from a second region of the plasma processing chamber;

a gas inlet for providing gas into the plasma processing chamber enclosure; and

a gas outlet for exhausting gas from the plasma processing chamber enclosure;

at least one RF power source electrically connected to the at least one electrode; and

a gas source in fluid connection with the gas inlet.

14. The apparatus, as recited in claim 13 further comprising a controller controllably connected to the gas source, the first light sensor, the second light sensor, and the at least one RF power source, comprising:

at least one processor; and

computer readable media, comprising:

computer readable code for flowing an etch gas from the gas source into the plasma processing chamber;

computer readable code for forming a plasma from the etch gas;

computer readable code for comparing a signal from the first light sensor with a signal from the second light sensor to determine when an etch stop has been reached; and

computer readable code for going to a next process after determining that an etch stop has been reached.

15. The apparatus, as recited in claim 14, wherein the plasma processing chamber further comprises a light source positioned to provide light to the first light sensor and the second light sensor.

16. The apparatus, as recited in claim 15, wherein the first region is closer to the substrate support than the second region.

17. The apparatus, as recited in claim 16, wherein the first region and the second region do not include the substrate support.