Plasma diagnosis by electrical method

Gi-Chung Kwon [1], Gi Won Shin [1], Woo Jae Kim [1], Hee Tae Kwon [1], and Hwan Hee Lee [1]

[1]*Kwangwoon university, Korea, Republic of*

The development speed of semiconductor and display device manufacturing technology is growing faster than the development speed of process equipment. so, There is a growing need for process diagnostic technology that can measure process conditions in real time and directly.

Generally, two methods were mainly used for the diagnosis of plasma: optical diagnosis method and electrical diagnosis method. OES(Optical Emission Spectroscopy) is mainly used as an optical diagnostic method. However, in the diagnostic method using OES, it is inconvenient to replace the optical filter according to the wavelength, and since the resolution of the optical filter is not good, it is difficult to find the signal desired by the user. In addition, there is a disadvantage in that by products generated in a deposition process or an etching process are deposited on an optical fiber receiving a light signal, thereby failing to absorb light.

The diagnosis using the electrical characteristics of the plasma is mainly performed by using the Langmuir probe. but, as with optical diagnosis, it is impossible to observe plasma characteristics when a byproduct from a deposition or etching process is deposited on a probe.

In this study, a plasma diagnosis was carried out using the impedance variation due to the plasma discharge. Prior experiment, Metal electrodes under a dielectric plate (well plate) were placed and an impedance variation was measured after discharging atmospheric pressure plasma jet. It was confirmed that the impedance value was measured differently according to the parameters of the atmospheric pressure plasma.