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Simple in situ method for real time measurement of dielectric film thickness in plasmas SUNG-HO JANG, GUN-HO KIM, CHIN-WOOK CHUNG, HanYang University — An in situ thickness measurement method of dielectric films (Dual frequency method) was developed, and the thickness was measured in an inductively coupled plasma. This method uses a small AC bias voltage which has two frequencies for the thickness measurement. The dielectric thickness is obtained from measuring amplitudes of two frequency ac current through a sensor and using an equivalent circuit model describing impedance of the dielectric film and the plasma sheath. In the experiment, thicknesses of Al_2O_3 film could be accurately measured in real time. To check the measurement reliability, the dual frequency method was compared with Reflection spectrophotometry as a kind of optical thickness diagnostics, and it was found that the dual frequency method agrees closely with reflection Spectrophotometry at various rf powers and pressures. In addition, this method is very simple and able to install at anywhere in plasma reactors in contrasted with optical methods, therefore it is expected to be applied to in situ surface diagnostics for various processing plasmas.

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