

Seminar

Institute for Plasma Research

Title : Plasma diagnostics of DC planar magnetron glow discharge

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Venue : Committee 3, New Building - IPR

Abstract:

DC planar magnetron is one of the popular methods to deposit thin films. Argon is generally used as sputtering gas and molecular gases like nitrogen and oxygen are used as reactive gases for the formation of compound thin films. The behavior of the plasma parameters in the background of such multi-component plasma is completely different from the normal single component plasma and therefore, the modulation of the plasma parameters (density profile, temperature and energy distributions) as a function of the reactive gas addition in such plasma is undoubtedly a subject for investigation. The conventional plasma diagnostics like the Langmuir probe, the optical emission spectroscopy have their limitations while using in the DC planar magnetron discharge. In order to overcome such limitation, the ion acoustic wave (IAW) is presented as an alternative diagnostic tool. Oxygen additive argon magnetron discharge plasma is probed by IAW and relative densities of negative ions present in such plasmas are evaluated. The obtained values of relative density of such ions are benchmarked by the Langmuir probe. It is also interesting to observe that non-linear ion acoustic propagation evolves into solitary wave in such plasma.

The magnetron target can also significantly alter the physical properties of magnetron discharge plasma. It is worth to explore the effects of magnetron target on the properties of the magnetron plasma. ISEE coefficient is found to be the crucial factor determining the properties of such discharge.

The correlation of the plasma parameters with the texture growth of the deposited thin films is achieved aiming an optimization of the deposition process. The substrate induced texture evaluation is also presented in this investigation.
