
Experimental characterization of a MHCD in Ar/N₂ mixture: Ar (1s₅) and N density measurements by absorption spectroscopy

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Résumé

An experimental characterization of a Micro Hollow Cathode Discharge (MHCD) in Ar/N₂ mixture, used in a deposition reactor of hexagonal boron nitride (h-BN), has been carried out. h-BN is a highly requested material for electronic and optoelectronic, given its large band gap and compatibility with graphene. The absolute densities of N-atoms and metastable argon (Ar(1s₅)) have been measured. Ar (1s₅) is an important species in the dissociation process of N₂, whereas N-atoms are required for growing h-BN films. The Ar (1s₅) has been measured by means of tunable diode laser absorption spectroscopy (TDLAS) and the N-atoms density was assessed with the VUV high resolution Fourier Transform spectrometer of the DESIRS beamline of the SOLEIL synchrotron. We have performed a parametric study, varying the MHCD hole diameter, the percentage of N₂ in the Ar/N₂ mixture, the discharge current and the gas pressure, so as to investigate their effect on the absolute densities of Ar(1s₅) and N-atoms. The results are compared to those of a global model of the MHCD.

Mots-Clés: MHCD, absorption spectroscopy, hexagonal boron nitride

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