DETERMINATION OF MAGNETRON PLASMA PARAMETERS BY OPTICAL EMISSION SPECTROSCOPY AND ARGON COLLISIONAL-RADIATIVE MODEL

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Optical emission spectroscopy (OES) is widely used for plasma diagnostics. Combined with some of plasma light emission models it becomes non-intrusive and versatile method of plasma parameters determination. In this work we determined electron density and its temperature in magnetron plasma by OES method based on a fitting of emission line intensities calculated from collisional-radiative model to experimental ones. The model describes kinetics of first 40 excited states of neutral argon Ar. The following processes are taken into account: electron impact excitation/deexcitation, spontaneous light emission, radiation trapping, electron impact ionization, and metastable quenching due to diffusion to walls. The population of various excited levels for argon plasma of midrange magnetron have been calculated and compared with OES measurements. Experimental spectra were registered by Avaspec 3648 spectrophotometer. The optical system has been calibrated with a tungsten-ribbon lamp. Determined electron density and temperature for magnetron plasma in different operating modes were tested and validated from its comparison with Langmuir probe measurements. The agreement between data of both techniques is satisfactory.

***Keywords:** Optical emission spectroscopy, Collisional-radiative model, Magnetron plasma.*