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Planar magnetron with electron injection and reflective electrode: numerical simulation of functioning processes

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In this work, we performed numerical simulation of the effect of a reflective electrode on the ionic composition of the planar magnetron plasma, in which discharge region an electron beam with independently-controlled electron current and energy is injected. The results of numerical simulation indicate that in such a configuration, higher concentrations of ions of the working gas (argon) and the target cathode (copper) of the magnetron are achieved due to a higher degree of confinement in the region of plasma generation of injected electrons due to their partial reflection and deflection in retarding field of the reflective electrode. The simulation results agree satisfactorily with the experimental mass-charge composition of the plasma ions of such a magnetron.

Keywords: planar magnetron, electron injection, reflecting electrode.

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