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VI characteristics and spatial emission profiles of hollow cathode discharge N. ŠKORO, D. MARIĆ, G. MALOVIĆ, Z. LJ. PETROVIĆ, Institute of Physics, Belgrade, Serbia, V. MIHAILOV, R. DJULGEROVA, Institute of Solid State Physics of Bulgarian Academy of Sciences, Sofia, Bulgaria — Our aim is to relate electrical properties of the hollow cathode devices to the spatial structure of the discharge, including discharge formation period. Special attention was given to the development of the hollow cathode effect. Commercial hollow cathode lamp sealed at 3.5 Torr (Ne) with cylindrical Mn cathode with bottom and a ring shaped anode was used. We measured VI characteristic and using emission profile images established current dependence of the peak emission intensity of the discharge. According to our data, hollow cathode discharge can be represented as a combination of discharges between parallel plates and inside the cavity. As the hollow cathode effect develops, the discharge moves from the cathode edge into the cavity, while the current density and emission intensity increase significantly. At the same time, the discharge voltage decreases. We were able to trace in time the discharge formation in several distinctive regimes of operation. Thus, we could connect certain points in transient phase with discharge spatial structure, revealing the discharge behavior.

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