

Abstract Submitted
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Microhollow Cathode Sustained Discharge with Split Third Electrodes SHARMIN SULTANA, JICHUL SHIN, University of Ulsan — The characteristics of stable, non-equilibrium, diffuse glow micro-hollow cathode sustained discharge (MCSD) with split third electrodes at moderate to atmospheric pressure in various flow rates are studied experimentally. Enlargement of sustained discharge volume in a split-electrode configuration is about eight times larger than that in a single planar third electrode case. At 100 Torr a maximum expansion of sustained glow discharge is measured as large as 10.3 mm with nine split third electrodes. Analytic estimate of average electron number density at the maximum expansion is measured to be as high as $2.99 \times 10^{10} \text{ cm}^{-3}$ at 5 mA third electrode current. In the presence of 0.1 slpm gas flow, the discharge region increases to 18.8 mm with corresponding estimated density of $2.48 \times 10^{10} \text{ cm}^{-3}$ at the same third electrode current. For specific pressure ranges, Faraday dark space is clearly visible near the MHCD hole. In the presence of gas flow across the gap, the sustained discharge is affected by linear momentum of the gas flow and its characteristics are altered accordingly such as current distribution over the electrodes. Feasibility of developing a flow velocimetry by using this dynamic phenomenon of MCSD with split electrodes is also studied.

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