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Fabrication process and electrical characterization of direct current parallel micro-discharges in helium M. MANDRA, UT Dallas, R. DUS-SART, U d'Orleans, J.-B. LEE, M. GOECKNER, UT Dallas, T. DUFOUR, P. LEFAUCHEUX, P. RANSON, U d'Orleans, L. OVERZET, UT Dallas — Micro Hollow Cathode Discharges (MHCD) have been fabricated. They are round holes through 250 μm or 500 μm thick Nickel-Alumina-Nickel surfaces. The base surfaces are constructed from 7.5 X 7.5 cm alumina wafers, which are vacuum baked then coated with chromium and copper seed layers and finally patterned. Nickel film, 5-6 um thick, is then deposited on either side of the alumina wafer using the process of electroplating. Single and multi cavity micro discharges are then laser drilled with diameters ranging from 130 μ m to 300 μ m and spacing between the cavities ranging from 245 μ m to 315 μ m. Breakdown vs. pressure measurements show that smaller diameter cavities (130 μ m) have higher breakdown voltages than cavities with larger diameter (300 μ m). In addition, the difference between the breakdown voltage and the operating voltage is substantially larger. Current-voltage measurements for single hole MHCD devices indicates that they operate in the normal glow regime with decreasing discharge voltage as discharge current is increased.

> L. Overzet UT Dallas

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