Abstract Submitted
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Enhanced lifetime for thin-dielectric microdischarge-arrays operating in DC REMI DUSSART, VALENTIN FELIX, GREMI - Univ Orleans - CNRS, LAWRENCE OVERZET, University of Texas at Dallas, OLIVIER AUBRY, ARNAUD STOLZ, PHILIPPE LEFAUCHEUX, GREMI - Univ Orleans - CNRS, GREMI - UNIV ORLEANS - CNRS COLLABORATION, UNIVERSITY OF TEXAS AT DALLAS COLLABORATION — Micro-hollow cathode discharge arrays using silicon as the cathode have a very limited lifetime because the silicon bubbles and initiates micro-arcing [1]. To avoid this destructive behavior, the same configuration was kept but, another material was selected for the cathode. Using micro and nanotechnologies ordinarily used in microelectronic and MEMS device fabrication, we made arrays of cathode boundary layer (CBL)-type microreactors consisting of nickel electrodes separated by a 6 m thick SiO_2 layer. Microdischarges were ignited in arrays of ˜100 m diameter holes at different pressures (200750 Torr) in different gases. Electrical and optical measurements were made to characterize the arrays. Unlike the microdischarges produced using silicon cathodes, the Ni cathode discharges remain very stable with essentially no micro-arcing. DC currents between 50 and 900 A flowed through each microreactor with a discharge voltage of typically 200 V. Stable V-I characteristics showing both the normal and abnormal regimes were observed and are consistent with the spread of the plasma over the cathode area. Due to their stability and lifetime, new applications of these DC, CBL-type microreactors can now be envisaged. [1] V. Felix *et Al.* Plasma Sources Sci. Technol., 25, 025021(2016)

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