LARGE SCALE Al/Al_2O_3 MICROCAVITY ARRAYS: ATMOSPHERIC PRESSURE OPERATION IN ELECTRONEGATIVE GASES

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Stable operation of large scale microcavity arrays in various electronegative gases is beneficial for a number of applications such as lighting, surface treatment, and biomedical diagnostics and therapeutics.[1]

In this presentation, we report the performance of large scale microplasma arrays having an active area larger than 25 cm^2 and their operation in gases which require high breakdown voltages. Al/Al_2O_3 electrodes are formed from single or multiple sheets of aluminum foil and the desired cross-sectional shape of the microcavities and microchannels are fabricated by the combination of a precisely-controlled electrochemical anodization process and a microfabrication technique.[2]

Operational and spectral characteristics of microplasma in gases such as O_2, N_2 and air at atmospheric pressures will be presented.

1. S.-J. Park and J.G. Eden, "Microdischarge Devices with a Nanoporous Al2O3 Dielectric: Operation in Ne and Air", IEEE Transaction on Plasma Science, 33, 2, 2005, p572

2. K.S. Kim, T.L. Kim, J.K. Yoon, S.-J, Park, and J.G. Eden, "Control of Cavity Cross-Section in Microplasma Devices: Luminance and Temporal Response of 200 x 100 and 320 x 160 Arrays with Parabolic Al2O3 Microcavities," Appl. Phys. Lett., 94, 2009, p011503.

*Work supported by the Korea Research Foundation Grant funded by the Korean Government (MOEHRD) (KRF-2009-352-D00117), and the Air Force Office of Scientific Research.