Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

Molded Microcavity Plasma Arrays And Channnels In Polymer Structures: UV Lighting Sources For Biophotonic Applications J. ZHENG, T.S. ANDERSON, J.H. MA, M. LU, B.T. CUNNINGHAM, S.-J. PARK, J.G. EDEN, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, UNIVERSITY OF ILLINOIS, URBANA, IL USA COLLABORATION — Arrays of microcavity plasma devices, transparent in the ultraviolet(UV) have been fabricated in multilayer polymer structures by replica molding process. Microscale, on-chip UV-emitting light sources integrated into plastic substrate are an attractive tool for biomedical diagnostics such as cell detection or radiation treatments. In this presentation, arrays of microchannels with cross-sectional dimensions as small as 100×100 μm^2 and lengths up to 2 inches (aspect ratio of 500:1) are described. Each channel is hermetically sealed and contains mixtures of UV emitting gas such as Ar/N_2, Ar/D_2, and Ar/H_2O at atmospheric pressures. Channels are fabricated adjacent to one or more microfluidic channels containing a liquid dye solution which is photoexcited by the microplasma. Driven by an ac voltage source, the microchannel plasmas are observed to be stable glows and the microplasma emission is found to be dependent upon the electrode geometry. The characteristics of the UV emission produced by the microplasmas, and the selective detection of dye samples in the fluidic channel will be discussed.

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Date submitted: 18 Jun 2007 Electronic form version 1.4