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Plasma Confinement in Glass Microcavities: Dependence of Plasma Properties on Microcavity Geometry. S.H. SUNG, A.G. BERGER, J.-Y. KIM, S.-J. PARK, J.G. EDEN, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, UNIVERSITY OF ILLINOIS, URBANA, IL USA TEAM — Arrays of glass microcavities having diameters of 50-200 μm and controllable geometries have been successfully fabricated by micropowder blasting techniques. Anisotropic or isotropic microcavities, including cavities with ellipsoidal geometry have been fabricated in large scale arrays with high resolution and various shapes of microcavities were prepared precisely. Arrays having as much as 1000 microcavities were fabricated on 400 μm thick soda lime glasses and a pair of these glasses was aligned and sealed to form a closed microdischarge cell. The cross-sectional microcavity shape in the discharge cell is designed from the calculation of electric field distribution. Powered by electrodes located outside the microcavity with ac frequencies of 20-100 kHz, the stable, uniform discharges and confinement of plasma in entire microcavity was observed at 300-800 Torr of noble gases. From the spatially-resolved measurement of emission from a microcavity, the device has better plasma confinement and increased emission intensity in higher gas pressures. Discharge performance in various gas or gas mixtures and its dependence on microcavity geometry will be discussed.

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