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Photochemical/Microchannel Plasma Reactors Driven By High Power Vacuum Ultraviolet Lamps CHUL SHIN, SUNG-JIN PARK, GARY EDEN, University of Illinois, Department of Electrical and Computer Engineering — Experiments are being conducted in which molecular dissociation or other chemical reactions in microchannel plasmas are accelerated by the introduction of vacuum ultraviolet photons. Initial emphasis is being placed on recently-developed Xe_2 lamps that are efficient sources of 172 nm ($h\nu \approx 7.2$ eV) photons. Thin, flat lamps, fabricated from fused silica and having microcavity arrays internal to the lamp, have been developed by the University of Illinois and Eden Park Illumination and produce intensities above 200 mW/cm^2. Integrating such lamps into a microcavity plasma reactor yields a hybrid photochemical/plasma system in which product yield and power consumption can be optimized. The selectivity of photodissociation in generating radicals and atomic fragments offers new synergies in plasma processing. Data concerning CO_2 dissociation in arrays of microchannel plasmas, and the modification of this process by external 172 nm radiation, will be presented.

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