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Fluorine Radical Production from Dissociation of CF_4 in Inductively Coupled Plasma[1] MITCHELL PAUL, West Virginia University, Applied Materials, COSTEL BILIOU, Applied Materials, EARL SCIME, West Virginia University — Defining parameters for the fluxes of fluorine radicals in an ion assisted directional reactive etch (DRE) device are presented. The etching device consists of an inductively coupled plasma source and angular distribution controlled ion extraction optics. Optical emission spectra of CF_4/O_2 plasma were analyzed over the 200 to 800 nm wavelength range and characteristic spectral features of CF_4 and its dissociation byproducts identified. Fluorine radical production rates were inferred by actinometry from ratios of integrated spectral intensities of F lines and trace rare gas lines. F radical production was investigated in correlation with precursor gas pressure and RF input power. The obtained results allow for optimization of the ion assisted etch process in CF_4/O_2 plasma.

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