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Interpreting Broadband Infrared Spectra with Variable Gas Temperatures in Fluorocarbon Plasmas CALEB NELSON, LAWRENCE OVERZET, MATTHEW GOECKNER, University of Texas at Dallas — Fourier transform infrared spectroscopy (FTIR) is a useful diagnostic in processing plasmas because of its ability to provide density measurements for a wide array of species and reveal unanticipated chemistries. However, *in situ* species identification and density measurements in plasma environments are complicated by incomplete reference spectra databases, overlapping band structures, spatial and temporal temperature changes, resolution limitations, and the possibility of nonlinear absorption in large density and pathlength combinations. Here, we address these problems for stable radicals found in fluorocarbon discharges. Integrated absorption cross-sections are presented for all fundamental bands in the 650 cm^{-1} to 2000 cm^{-1} region for C_3F_6, C_4F_8, C_3F_8, C_2F_6, C_2F_4, and CF_4. In addition, the binary and ternary combination bands up to 4000 cm^{-1} are presented for each species. The results show that with the exception of CF_4 the integrated absorption cross-sections do not change significantly as gas temperature increases. The internal temperature of the absorbing species can be estimated from the rotational band maximum in most cases. Subtracting temperature-adjusted reference spectra, allows accurate density measurements of low density species and the separation of overlapping spectra such as CF_2 and C_2F_6.

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