

VIBRATIONAL OVERTONE SPECTRA OF C_2H_6 AND C_2H_4 IN CRYOGENIC LIQUIDS

MARIA H. DIEZ-Y-RIEGA and CARLOS E. MANZANARES, *Department of Chemistry and Biochemistry, Baylor University, Waco, Texas, 76798.*

Vibrational overtone spectra of C_2H_6 and C_2H_4 in cryogenic solutions were recorded between 5000 and 14000 cm^{-1} . Spectral regions for the first four overtones were measured using a Fourier transform spectrophotometer. The fifth overtone ($\Delta\nu = 6$) spectra between 15,000 and 16,000 cm^{-1} were recorded with a double beam (pump-probe) thermal lens technique using concentrations as low as 10^{-3} mole fraction. The peak frequency shift ($\Delta\omega$) from gas phase to solution is explained by the change in harmonic frequency and anharmonicity in solution with respect to the gas phase values. The bandwidth ($\Delta\omega_{1/2}$) of the ($\Delta\nu = 6$) C-H absorption bands in solution can be explained in terms of collisions with the solvent molecules.