

OVERTONE AND COMBINATION BAND SPECTROSCOPY OF JET COOLED METHANOL

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Overtone spectra of jet-cooled methanol have been recorded from 5,000 to 14,000 cm^{-1} using Infrared Laser Assisted Photofragment Spectroscopy (IRLAPS) for the detection of the vibrationally excited molecules.

In addition to the OH stretch overtones ($n\nu_1$), the major components of the spectra are the overtones of the CH stretch (up to $5\nu_{CH}$) as well as combinations of the OH stretch with the CO stretch ($n\nu_1+\nu_8$), the COH bend ($n\nu_1+\nu_6$), and both ($n\nu_1+\nu_6+\nu_8$). These data, together with photoacoustic data [1] up to 18,250 cm^{-1} and previously reported IRLAPS data [2] up to 22,166 cm^{-1} , have been fit to an anharmonic Hamiltonian. In this Hamiltonian, the CH stretch vibrations are treated as a pair of local modes, ν_a and ν_b , for $\nu_{CH} = 3$ and higher. The other modes are treated as the usual normal vibrations.

[1] H.L. Fang, D.M. Meister, R.L. Swofford, *J. Phys. Chem.* 88, 405-409 (1984).

[2] O.V. Boyarkin, L. Lubich, R.D.F. Settle, D.S. Perry, T.R. Rizzo, *J. Chem. Phys.* 107, 8409-8422 (1997).