HIGH RESOLUTION DIRECT ABSORPTION SPECTROSCOPY OF HYDROXYMETHYL RADICAL IN THE MID-INFRARED

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Hydroxymethyl radical has a rich history in the literature, with over 100 theoretical and experimental papers, and is an important molecule in both atmospheric and combustion chemistry. We recently obtained high resolution direct absorption spectra for CH-stretch excitation of hydroxymethyl radical, with fully resolved rovibrational bands in the mid-IR, by taking advantage of the low rotational temperatures and sub-Doppler linewidths obtained in a slit supersonic expansion. Jet cooled hydroxymethyl radical is formed by striking a discharge over a mixture of methanol and Ne/He carrier gas at the slit orifice of a nozzle. The rovibrational transitions are fit to a Watson A-reduced asymmetric top Hamiltonian to yield improved rotational constants and new insights into the large amplitude dynamics in this important radical species. The results both augment and make for interesting comparison with previous studies by Feng et al[a], which were based on double resonance ionization detected IR methods to obtain moderate resolution spectra in the CH- and OH-stretching region.

[a] L. Feng, J. Wei and H. Reisler, *J. Phys. Chem. A* **108**, 7903 (2004).