INFRARED SPECTROSCOPY OF N-METHYLACETAMIDE IN SOLID PARAHYDROGEN

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N-methylacetamide ($CH_3CONHCH_3$, NMA) is the simplest model compound for the linkage between peptide units and as such has been the subject of numerous studies. It has a single CONH unit that is thought to be predominantly planar, favoring the $trans$ over the cis conformation by a factor of 100 at room temperature. However, the vibrational modes of NMA depend strongly on its conformation. This talk will focus on recent FTIR studies of NMA in solid parahydrogen where we will examine the possibility of trapping the higher energy cis conformer using the rapid vapor deposition technique developed by Fajardo and coworkers. Other researchers have measured the vibrational decay of the CO stretch excited state of fully deuterated NMA in D_2O and found it to be faster than found in other peptides, specifically biexponential with time constants of 0.45 and 4 ps having weights of 1 and 0.2, respectively. This study will measure the high resolution linewidth of the CO stretch fundamental of NMA in solid parahydrogen to compare with the previous time-resolved pump-probe measurements. Finally, measurements are also reported for the overtone of the CO stretch to allow the anharmonicity of this mode to be measured directly.