HIGH RESOLUTION NEAR INFRARED SPECTRA OF THE CH STRETCHING MODES IN JET COOLED ETHYL RADICAL

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High resolution near infrared spectra of the symmetric and anti-symmetric CH_2 stretch of the ethyl radical, C_2H_5, is recorded and analyzed. The radical is created in a glow discharge, slit supersonic expansion. Effecient rotational cooling (T_{rot} 14 K) simplifies the spectra, premitting accurate determination of both ground and vibrationally excited state rotational constants. Furthermore, detailed analysis of the spectra in terms of a rigid top-rigid frame Hamiltonian yields detailed information about the ethyl potential surface, in particular, shedding light on the equilibrium geometry and the magnitude of barriers to internal CH_2-CH_3 rotation.