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

SCOTT DAVIS, DAIRENE UY and DAVID J. NESBITT. JILA, National Institute of Standards and Technology and Department of Chemistry and Biochemistry, University of Colorado, Boulder, Colorado 80309-0440.

High resolution near infrared spectra of the symmetric and anti-symmetric CH$_2$ stretch of the ethyl radical, C$_2$H$_5$, is recorded and analyzed. The radical is created in a glow discharge, slit supersonic expansion. Efficient rotational cooling (T$_{rot}$ 14 K) simplifies the spectra, permitting 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.