HIGH-RESOLUTION INFRARED SPECTROSCOPY OF JET-COOLED VINYL RADICAL: SYMMETRIC CH_2 STRETCHING VIBRATIONS

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Vinyl radical, C_2H_3, is a transient but fundamental hydrocarbon species which plays important roles in a number of combustion processes. Previous high resolution spectroscopic studies of this species have been very limited; only the CH_2 wagging mode in the electronic ground state has been [a] studied with IR diode laser absorption methods. Guided by both recent time-resolved FTIR emission [b] and high level density functional predictions, we have recently used the slit jet discharge IR laser spectrometer to observe and assign high-resolution infrared spectra of jet-cooled vinyl radical in the symmetric CH_2 stretch region. In addition to structural information, the tunneling dynamics due to in-plane rocking of the α-C-H will be discussed.

[a] H. Kanamori, Y. Endo, and E. Hirota, J. Chem. Phys. 92 (1), 197 (1990).

[b] L. Letendre, D. K. Liu, C. D. Pibel, J. B. Halpern, and H. L. Dai, J. Chem. Phys. 112 (21), 9209 (2000).