NEAR-INFRARED LASER SPECTROSCOPY OF C_2H

DENNIS W. TOKARYK, *Physics Department, University of New Brunswick, Fredericton, NB, Canada E3B 5A3*.

C_2H, a linear radical, is a very common speices in the interstellar medium and in other astrophysical sources. It is also produced in flames, and is an important fragment in the photodissociation of acetylene. The molecule has a very complex infrared and near-infrared spectrum due to strong interactions between the ground state $\widetilde{X}\ ^2\Sigma^+$ ground state and the first excited electronic state $\widetilde{A}\ ^2\Pi$, about 3700 cm^{-1} above.

We have found that we produce a great deal of C_2H in a methane-helium plasma set up originally to investigate the spectrum of C_3 with near-infrared diode lasers. Four new bands in the 6000-7000 cm^{-1} range have been observed so far, all originating on $\widetilde{X}\ ^2\Sigma^+$. A previously published study[a] on the spectrum of matrix-isolated C_2H indicates that many more bands can be observed in nearby regions. We will present an overview of the work done to date, and discuss the implications of this work in achieving a better understanding of the complicated spectrum of this simple radical.

[a] D. Forney, M. E. Jacox, and W. E. Thompson, J. Mol. Spectrosc. **170**, 178 (1995).