

CAVITY RINDDOWN SPECTROSCOPY OF THE $\tilde{A} - \tilde{X}$ ELECTRONIC TRANSITION OF THE $\text{CH}_3\text{C}(\text{O})\text{O}_2$ RADICAL

SERGEY J. ZALYUBOVSKY, BRENT G. GLOVER, TERRY A. MILLER, *Laser Spectroscopy Facility, Department of Chemistry, The Ohio State University, 120 W. 18th Avenue, Columbus OH 43210.*

The acetyl peroxy radical, $\text{CH}_3\text{C}(\text{O})\text{O}_2$, is one of the most abundant organic peroxy radicals in the atmosphere^a. It plays a significant role in many key atmospheric processes, including the atmospheric ozone balance^b and the formation of peroxy acetyl nitrate^c, a key component in photochemically generated smog.

Various advantages in spectroscopic and kinetic applications can be gained by studying peroxy radicals via their near IR electronic transition^{d,e}. In this talk we report cavity ringdown spectra of the $\tilde{A}^2A' - \tilde{X}^2A''$ electronic transition of acetyl peroxy radical and its perdeutero analog. For $\text{CH}_3\text{C}(\text{O})\text{O}_2$, a T_{00} electronic origin is observed at $5582.5(5) \text{ cm}^{-1}$, and several \tilde{A} state vibrational frequencies are measured and assigned. Extensive *ab initio* calculations have been carried out to confirm assignments for the electronic origin and observed vibrational hot bands. The empirical absorption cross section for the origin of $\tilde{A}^2A' - \tilde{X}^2A''$ transition has been estimated.

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