OBSERVATION OF THE $\tilde{A}-\tilde{X}$ ELECTRONIC TRANSITION OF THE ISOMERS AND CONFORMERS OF PENTYL PEROXY RADICAL USING CAVITY RINGDOWN SPECTROSCOPY

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Alkyl peroxy radicals ($C_nH_{2n+1}O_2$) are important reactive intermediates in both combustion and atmospheric chemistry. Due to the fact that the combustion of fuels, which contain *n*-heptane and isooctane components, must pass via these moderate sized peroxy radicals, all $n<10$ radicals are potentially interesting. However, as *n* increases, these alkyl peroxy radicals also grow in complexity due to the fact that the number of isomeric and conformeric forms of the radical increases dramatically.

We have previously studied the $\tilde{A}-\tilde{X}$ electronic transition of methyl, ethyl, propyl and butyl (*n*=1-4) peroxy radicals using cavity ringdown spectroscopy. From these studies, we have proven that this electronic transition, unlike the $\tilde{B}-\tilde{X}$, is a powerful tool for not only distinguishing between different alkyl peroxy radicals, but also for distinguishing among isomers and conformers of the same alkyl peroxy radical. In this talk, we report the extension of this spectroscopic technique to the next larger alkyl peroxy radical (*n*=5), pentyl peroxy radical ($C_5H_{11}O_2$). The unique electronic spectra of all eight isomers of $C_5H_{11}O_2$ will be presented, with multiple conformer bands for each isomer also resolved.