SPECTROSCOPY OF SUBSTITUTED CYCLOHEXOXY RADICALS AND KINETICS OF THEIR REACTIONS WITH O_2

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The laser induced fluorescence spectrum of the $\tilde{B}$ state of 4-methyl cyclohexoxy radical was obtained at 228 K and 50 Torr N_2. The spectrum appears to arise only from the *trans* isomer, and is very similar to that observed from cyclohexoxy radical, itself. Thermodynamic arguments indicate the spectrum must arise almost solely from the di-equatorial chair conformer. No significant fluorescence was observed from 4-*tert*-butyl cyclohexoxy radical. Rate constants were obtained for the reaction of *trans*-4-methyl cyclohexoxy radical and *d11*-cyclohexoxy radical with O_2. Rate constants were measured between 228 and 301 K, and are independent of pressure (50-125 Torr). The temperature dependence of the rate constant for *trans*-4-methyl cyclohexoxy radical is not as great as that previously measured for cyclohexoxy radical, but is greater than that found previously for acyclic alkoxy radicals.