

UNTANGLING THE NEAR-IR HIGH RESOLUTION SPECTRUM OF THE METHYL PEROXY RADICAL

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The jet-cooled high resolution CRDS spectra of the methyl peroxy radical, CH₃OO and CD₃OO has been obtained for the weak $\tilde{A}^2A' \leftarrow \tilde{X}^2A'' 0_0^0$ band. The rotational spectra of the isotopologue species exhibit very different structure. The hindered internal rotational involving methyl and O₂ groups is a source of this very different structure, due to the strong dependence of the tunneling splitting upon mass through the F parameter ($\sim 4.4 \text{ cm}^{-1}$ for CD₃OO compared to $\sim 7.0 \text{ cm}^{-1}$ for CH₃OO). We will discuss the formalism in the limit of the high torsional barrier in the light of the experimental results, emphasizing the spectral resemblances and differences.