

## HIGH RESOLUTION INFRARED SPECTROSCOPY OF THE FLUOROMETHYL RADICAL

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The CH<sub>2</sub>F radical is an intermediate in the decomposition of various atmospheric species and is also important in free radical addition reactions. Previous work on the CH<sub>2</sub>F radical has utilized microwave spectroscopy to determine rotational transitions within the ground vibrational state (the symmetric C-H stretch)<sup>a</sup>. Infrared spectroscopic methods have also been used to probe the  $\nu_3$  band (C-F stretch) origin and rotational constants<sup>b</sup>.

We have used high resolution (0.0005 cm<sup>-1</sup>) infrared spectroscopy to investigate rovibrational transitions and assign band origins for both the symmetric and asymmetric stretch regions of the CH<sub>2</sub>F radical. Measurements were taken using direct absorption (sensitivity = 1 x 10<sup>-7</sup> per root Hz) under slit-jet cooled conditions (20 K). Assignment of the spectrum (up to J=7) has yielded refined lower and upper state rotational and centrifugal distortion constants for this near-prolate top. The ratio of absorption intensities for the symmetric and asymmetric bands provides an interesting comparison to that of the CH<sub>2</sub>Cl radical, where no asymmetric band was detected. Interpretation of hyperfine structure will also be discussed.

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<sup>a</sup>Y. Endo, C. Yamada, S. Saito, and E. Hirota, *J. Chem. Phys.* 79(4), 1983.

<sup>b</sup>C. Yamada and E. Hirota, *J. Molec. Spec.* 116, 1986.