THE MILLIMETER/SUBMILLIMETER-WAVE SPECTRUM OF F_2SO ($\tilde{X}^1A'$)

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The millimeter/submillimeter spectrum of F_2SO ($\tilde{X}^1A'$) has been measured using direct absorption techniques in the frequency range 271 – 508 GHz. Thionyl fluoride was created in the process of searching for a number of metal-containing fluoride molecules. This species was serendipitously produced from SF_6 as the fluorine source with residual water in the presence of a DC discharge. Multiple rotational transitions in the range J = 16 to J = 30 were recorded, each consisting of a c-type asymmetric top pattern, due to the large dipole moment along the ĉ molecular axis μ_c = 1.62 D. The data were analyzed using an asymmetric top Hamiltonian and rotational and centrifugal distortion constants were established. This work considerably expands the spectroscopic characterization of F_2SO. Previous microwave data consisted of measurements below 77 GHz.