SPECTROSCOPY OF CHLOROSYL FLUORIDE, FClO

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FClO has been proposed as an intermediate in reactions involving ClF, Cl_2O, and ClF_3O, and it has been suggested as a molecule of atmospheric interest. It has been prepared *in situ* by the hydrolysis of ClF_3. Selected transitions of its pure rotational spectrum were searched for in the millimeter and submillmeter regions using predictions based on an analysis of the ν_1 band.[a] Low field Stark measurements have been performed in the millimeter region. FClO is an asymmetric prolate top, κ = –0.8950 for $F^{35}ClO$, with a rather small dipole component of 0.093 (4) D along the *a*-axis and a larger one of 1.93 (5) D along the *b*-axis. Transitions with $1 \leq J \leq 66$ and $0 \leq K_a \leq 19$ were observed. Even in the submillimeter region Cl hyperfine splitting was resolved partially. Two low J transitions were observed by microwave Fourier transform spectroscopy yielding some information on the ^{19}F spin-rotation tensor.

Structural parameters, harmonic force constants, and nuclear magnetic shielding parameters were derived and will be compared with data of related molecules, such as ClF_3, ClF, $FClO_2$, $FClO_3$ and SF_2. High resolution infrared spectra were taken in the regions of the FCl stretching mode and bending mode around 600 and 310 cm^{-1}, respectively. A preliminary analysis indicates that the FCl stretch, at 596.863 cm^{-1} for $F^{35}ClO$, is in Coriolis and Fermi resonance with the dark overtone of δ at 617.1 cm^{-1}. A brief progress report will be given.

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[a]H. S. P. Müller, submitted