THE MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF TRIFLUOROETHYLENE-HYDROGEN FLUORIDE

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The rotational spectra of four isotopomers of the 1,1,2–trifluoroethylene-hydrogen fluoride complex (HF-$CHFCF_2$, DF-$CHFCF_2$, HF-$^{13}CHFCF_2$, and HF-$CHF^{13}CF_2$) have been collected in the 7–22 GHz region with a Fourier transform microwave spectrometer. The complexes are generated using pulsed jet expansion of a mixture of HF (or DF), $CHFCF_2$, and Ar, and the two ^{13}C-containing isotopomers are observed in natural abundance. Only a-type transitions are seen for all isotopomers, and for most lines in the DF-containing isotopomer, deuterium nuclear quadrupole hyperfine structure is not resolved within the experimental linewidth of 10–15 kHz. Both the Kraitchman substitution coordinates and the rotational constants are consistent with a planar structure in which a hydrogen bond is formed between H in HF and the F on C-2 in $CHFCF_2$ with a secondary interaction between the H (geminal to the F involved in the hydrogen bond) in $CHFCF_2$ and the F in HF.