THE EFFECT OF PROTIC ACID IDENTITY ON THE STRUCTURES OF COMPLEXES WITH VINYL CHLORIDE: FOURIER TRANSFORM MICROWAVE SPECTROSCOPY AND MOLECULAR STRUCTURE OF THE VINYL CHLORIDE-ACETYLENE COMPLEX

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In all previous examples of complexes formed between protic acids and haloethylenes, we have observed similar modes of binding regardless of the specific identity of the acid, HF, HCl, or HCCH. Although details of the structures, such as hydrogen bond length and amount of deviation from linearity, do reflect the strength of the interaction and show clear correlations with the gas-phase acidity, the complexes of a given haloethylene with any of the acids have identical structural motifs. As part of a systematic study of the effects of chlorine substitution on intermolecular interactions of haloethylenes, we have studied the complexes of vinyl chloride with both HF and HCCH. The HF complex, reported last year, has a geometry with HF interacting across the double bond of vinyl chloride and forming a secondary interaction with the hydrogen *cis* to the chlorine atom. We have obtained the broadband, chirped-pulse and narrow band, Balle-Flygare Fourier transform microwave spectra of the vinyl chloride-HCCH complex. The spectra indicate that HCCH locates at one end of the vinyl chloride with the secondary interaction occurring with the geminal hydrogen atom.