THE MICROWAVE SPECTRUM OF ARGON-VINYL CHLORIDE

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Through the systematic comparison of the structures of a series of complexes formed between protic acid and fluorine substituted ethylenes, we have been able to observe how tuning the properties of the functional groups (F and H atoms) in ethylene using additional F atoms causes these groups to compete or cooperate with each other in intermolecular interactions. A necessary step for expanding our work in the next natural direction by examining the effects of the less electronegative, but more polarizable Cl atom is the determination of the structures of protic acid-vinyl chloride complexes. Since the rich microwave spectrum of Ar-vinyl chloride has not previously been reported, it is essential to first characterize this rare gas complex. We have observed strong *b*-type and weak *a*-type transitions for both ^{35}Cl and ^{37}Cl versions of this species, all of which appear to be doubled. Although *ab initio* calculations suggest a sufficiently large value of μ_c, *c*-type lines remain elusive. Indeed, these same calculations reveal the presence of several minima on the interaction potential energy surface, which may provide an explanation.