

THE MICROWAVE SPECTRA OF THE VAN DER WAALS COMPLEXES: Ar·AgX (X=F,Cl,Br)

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The microwave spectra of the van der Waals complexes Ar·AgF, Ar·AgCl, and Ar·AgBr have been measured in the frequency region 6-24 GHz, using a pulsed jet Fourier transform microwave spectrometer. This is the first spectroscopic observation of a rare gas-silver halide complex. The complexes were generated by ablating a Ag rod in the presence of Ar (5-6 atm.) and a low percentage of SF₆, Cl₂, or Br₂. The complexes were found to have a linear structure and their rotational and centrifugal distortion constants have been obtained. For Ar·AgCl and Ar·AgBr the electric quadrupole coupling constant has been determined for both isotopes of Cl and Br. The determined rotational constants have been used to evaluate the r_0 and r_s geometries of the complexes. The bond length between Ar and Ag was found to be abnormally short. Possible reasons for this will be discussed.