MICROWAVE SPECTRA AND GEOMETRIES OF $H_2C_2\cdots AgCl$ AND $H_2C_2\cdots CuCl$

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Pure rotational spectra of the vibrational ground states of $H_2C_2\cdots AgCl$ and $H_2C_2\cdots CuCl$ have been measured by chirped-pulse FTMW spectroscopy. Each complex is generated via laser ablation of the metal in the presence of small percentages of CCl_4 and C_2H_2 in argon. The complexes are stabilized and interrogated in the cold environment of a supersonic jet. Rotational constants (B_0, C_0) and the centrifugal distortion constant, Δ_J, have been measured for six isotopologues of $H_2C_2\cdots AgCl$ and three isotopologues of $H_2C_2\cdots CuCl$ with substitutions at the metal, chlorine and carbon atoms in each case. The spectrum of each complex is consistent with a C_{2v} structure in which the metal atom is coordinated by the π-orbital of ethyne. The measured rotational constants allow determination of the length of the bond between the metal and chlorine atoms, *r*(M—Cl), and the distance between the metal atom and the centre of the ethyne double bond, *r*(M—*). Nuclear quadrupole coupling constants have been measured for the chlorine atom in each complex and also for copper in $H_2C_2\cdots CuCl$.