PHOTODISSOCIATION SPECTROSCOPY OF THE Ca^+-ACETYLENE π-COMPLEX

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Ca^+-C_2H_2 is produced in a molecular beam and studied with mass-selected photodissociation spectroscopy. A spectrum with sharp vibrational and rotational structure is measured near the Ca^+ (^{2}P-^{2}S) transition. Ca^+-C_2H_2 has a π-complex structure with a Ca^+-C_2H_2 bond distance of $r_0'' = 2.80$ Å, a vibrational frequency (Ca^+-C_2H_2 stretch) of $\Delta G''_{1/2}$ = 169 cm^{-1} and a dissociation energy of D_0'' = 18.6 kcal/mol. This is the first determination of these properties for an isolated metal cation π-complex.