

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

M. R. FRANCE, S. H. PULLINS, and M. A. DUNCAN, *Department of Chemistry, University of Georgia, Athens, GA 30602.*

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^+ ($^2\text{P}-^2\text{S}$) transition. Ca^+ - C_2H_2 has a π -complex structure with a Ca^+ - C_2H_2 bond distance of $r_0'' = 2.80 \text{ \AA}$, a vibrational frequency (Ca^+ - C_2H_2 stretch) of $\Delta G_{1/2}'' = 169 \text{ cm}^{-1}$ and a dissociation energy of $D_0'' = 18.6 \text{ kcal/mol}$. This is the first determination of these properties for an isolated metal cation π -complex.