

## UNEXPECTED GENERATION AND OBSERVATION OF A T-SHAPED COMPLEX OF $\text{H}_2\text{C}_2 \cdots \text{AgCCH}$

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An experiment to probe species generated within a supersonically-expanding jet consisting of  $\text{SF}_6$ , Ag,  $\text{C}_2\text{H}_2$  and argon by broadband rotational spectroscopy revealed the existence of a T-shaped complex of hitherto unknown origin. Empirical tests revealed that this complex requires the presence of  $\text{C}_2\text{H}_2$  and Ag within the gas sample. While the intensity of the associated transitions are enhanced by the presence of  $\text{SF}_6$ , theoretical calculations and empirical tests implied that the identified complex is  $\text{H}_2\text{C}_2 \cdots \text{AgCCH}$  rather than the original target of the experiment,  $\text{H}_2\text{C}_2 \cdots \text{AgF}$ . This deduction is now supported by evidence acquired through experiments exploiting  $^{13}\text{C}$ -enriched isotopic samples. Transitions have been assigned for the  $\text{H}_2\text{-}^{13}\text{C}_2 \cdots \text{Ag-}^{13}\text{C}^{13}\text{CH}$  isotopologue. Data acquired from each isotopologue allows determination of the rotational constants ( $B_0$ ,  $C_0$ ) and centrifugal distortion constant,  $\Delta_J$ . The data are consistent with a T-shaped complex in which the Ag atom of AgCCH binds to electrons within the  $\pi$ -orbitals of ethyne. Preliminary determinations of bond lengths will be presented. Experiments are in progress to measure the spectra of deuterated isotopologues.