THE SPECTROSCOPY OF THE PRODUCTS OF METASTABLE DIACETYLENE REACTIONS WITH AROMATICS

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Diacetylene is an important molecule in the reactions that occur in combustion processes, Accordingly, we have undertaken a systematic study of the reactions of metastable diacetylene ($C-4H-2^*$) with hydrocarbons of importance in combustion. Resonant two-photon ionization has been used to spectroscopically characterize many of the products formed. Presented here are the reactions of diacetylene with aromatic molecules, principally benzene. Following pulsing of a reaction mixture into a short tube affixed to the outlet of a pulsed valve, photoexcitation of the diacetylene followed by intersystem crossing produces the metastable triplet state species of interest. Reaction with benzene and toluene then occurs prior to expansion of the reaction mixture into the extraction region of a time-of-flight mass spectrometer. Resonant two-photon ionization spectra of the principal products of the reaction of $C-4H-2^*$ with benzene and toluene will be discussed.