VACUUM UV STUDY OF THE PHOTOCHEMISTRY OF TRANSIENT DIATOMIC C-BEARING MOLECULES

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The chemical evolution in photon-dominated regions (PDRs), including some diffuse interstellar clouds and protoplanetary disks, is closely related to photochemistry triggered by vacuum ultraviolet (VUV) photons, which act as the most important source of energy in such astronomical enviroments. Though the photodissociation and photoionization of transient diatomic C-bearing molecules play an important role in the chemical network of carbon in space, a lack of laboratory studies and theoretical calculations of their high-lying excited states impedes accurate modeling of their photochemistry and interpretation of astronomical observations. We have investigated the photochemistry of two molecules CS and C_2 in the VUV region. Experimentally, the molecules are generated by photolysis or discharge of corresponding precursors and then supersonically expanded into a vacuum chamber, where they are interrogated by state-selective VUV-VUV spectroscopy coupled with velocity map imaging. In combination with new accurate *ab initio* calculations, our study contributes quantitative data for use in photochemical databases.