

Infrared Photodissociation Spectroscopy of Benzene Cluster Ions: Charge Distribution in Electronic Ground State and Charge Hopping in Photoexcited States

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Photodissociation spectroscopy is applied to benzene cluster ions in the C-H stretching region. The infrared photodissociation spectra of (benzene) $_n^+$ ($n=3-5$) clearly show a sharp band at 3066 cm^{-1} . The band is attributed to a C-H stretching vibration of the dimer ion core. The infrared spectra can be reproduced by combining the C-H stretching band of the dimer ion core and a C-H stretching Fermi triad of the solvent benzene molecule. The infrared photodissociation spectra of mixed benzene trimer ions with one or two benzene- d_6 molecules demonstrate that there is no correlation between the dimer ion core sharing the positive charge in the ground state and the photofragment dimer ion. This implies that a dimer ion core switching occurs in photoexcited vibrational states prior to the dissociation. We also discuss the charge distribution and the charge hopping in benzene-toluene mixed trimer ions.

ポスター発表