INFRARED RESONANCE ENHANCED PHOTODISSOCIATION SPECTROSCOPY OF METAL ION-BENZENE COMPLEXES

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First row transition metal ion-benzene complexes of the form $M^+(\text{benzene})_{1-3}$ are produced by laser vaporization in a pulsed nozzle source, mass-selected in an ion-trap mass spectrometer and excited in the infrared with a free electron laser. Multiphoton dissociation occurs by the elimination of whole benzene molecules. The photofragment yield versus wavelength produces IR resonance-enhanced multiphoton photodissociation (IR-REMPD) spectra for these complexes. Vibrational bands observed in the 600-1800 cm^{-1} region correspond to modes in the benzene molecules, but are shifted from those of free benzene due to the interaction with the metal ion.