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^+(benzene)$_x$ and M^+(benzene)$_x$ Ar are produced by laser vaporization in a pulsed nozzle source, mass-selected in a time of flight mass spectrometer and excited in the infrared with an OPO/OPA laser system. Multiphoton dissociation occurs by the elimination of whole benzene molecules or argon. The photofragment yield versus wavelength produces IR resonance-enhanced multiphoton photodissociation (IR-REMPD) spectra for these complexes. Vibrational bands observed in the 2700-3300 cm^{-1} region correspond to vibrational modes in the benzene molecules but are shifted from those of free benzene due to the interaction with the metal ion.