INFRARED PHOTODISSOCIATION SPECTROSCOPY OF METAL WATER INTERACTIONS

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Metal cation water complexes are formed via laser ablation in a pulsed nozzle molecular beam configuration. Ions are then mass selected in a reflectron time-of-flight mass spectrometer and analyzed. IR photodissociation spectroscopy is used to investigate $M^+(H_2O)$ complexes in the OH stretching region. Different metals, including alkali, alkaline earth, and first row transition metals are analyzed in this study to determine if any trends are present. By looking at the shift of the symmetric and asymmetric stretches of water, the bonding schemes of the metal water complex can be determined. Some metals show a greater red shift in the OH stretching frequencies than others, which is not directly tied to the binding energy. Along with the studies of the monohydrated metal complexes, a systematic study of the solvation of a metal cation will be presented and compared to previous work.