INFRARED PHOTODISSOCIATION SPECTROSCOPY OF $M^+(H_2O)Ar_n$ COMPLEXES: IDENTIFICATION OF STRUCTURAL ISOMERS

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$M^+(H_2O)Ar_n$ (M = Mg, Fe) complexes are produced in a laser ablation, pulsed nozzle source, mass-selected and studied with infrared photodissociation spectroscopy. The infrared action spectra are acquired by monitoring the loss of argon as a function of energy in the region of the symmetric and asymmetric vibrations of water (3657 cm^{-1}, 3756 cm^{-1}). In both cases there is evidence that the OH groups compete with the metal ion for the binding of argon. Argon bound to water causes the OH fundamentals to shift significantly to the red, an effect similar to hydrogen bonding. The experimental spectra of the $Mg^+(H_2O)Ar_n$ complexes are compared to theoretical spectra of structures calculated at the MP2 level.