Abstract for an Invited Paper
for the MAR09 Meeting of
The American Physical Society

Surveying the potential landscapes controlling the accommodation of excess electrons by water networks

MARK JOHNSON, Yale University

We present recent results of a new experimental approach where we use ir-ir pump-probe methods to measure the transition states and relative energies of isomers associated with the negatively charged water clusters. First, the vibrational spectra of various isomers are systematically disentangled using hole-burning Ar predissociation spectroscopy in a triple-stage time-of-flight mass spectrometer. We then monitor the spectra of fragment ions that are created by photoevaporation of Ar atoms through the various vibrational levels identified in the spectroscopic step. The major conclusion is the weak binding isomers are readily transformed into more strongly bound forms, while the reverse process is very inefficient. We describe progress on using this strategy to identify the large amplitude motions available in the finite systems using trace isotopes.