Infrared Spectroscopic Characterization of Hydrogen-Bonded Water Networks in Gas-phase Hydrated Clusters

Kenta Mizuse (Institute for Molecular Science, Japan)

Hydrated clusters X-(H$_2$O)$_n$ in the gas phase have been extensively studied for the purpose of molecular-level characterization of various hydrogen-bonded water networks. Studies of small-sized clusters ($n$ = ten or so) have succeeded in identifying relatively simple water networks e.g., chain and small cage structures. To model more complex water networks, much more water molecules should be included in the clusters. In my talk, our recent IR spectroscopic investigations of larger-sized (up to $n$ = 200) clusters will be presented. Structural development from the small to bulky networks has been found. In these studies, we often encounter spectral complexity due to the thermal effect and the number of isomers. We will also demonstrate the trial method to control the internal energy (vibrational temperature) and isomer distribution. This technique simplifies the spectra and will be a powerful tool for more detailed understanding of water networks.

Refs.