INFRARED SPECTROSCOPY OF SIZE-SELECTED NEUTRAL AND CATIONIC AMMONIA CLUSTERS COMBINED WITH VACUUM-ULTRAVIOLET-PHOTOIONIZATION MASS SPECTROSCOPY

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We newly developed two new schemes of mass-selective IR spectroscopic techniques based on the vacuum ultraviolet (VUV) one-photon ionization detection. In both scheme, the ion intensity of the mass-selected species is used as a measure of the population of the corresponding cluster species. The IR excitation of the species may cause the vibrational predissociation leading to the population reduction, which appears as a dip spectrum of the photoionization signal. The first one is called VUV-ionization-detected IR predissociation spectroscopy (VUV-ID-IRPDS), which can be applied for neutral clusters. The method was applied to the IR spectra of ammonia dimmer and trimer. The second one is called IR predissociation spectroscopy for VUV pumped ion (IRPDS-VUV-PI). It was applied to the IR spectra of ammonia cluster cations $(NH_3)_n{}^+$(n=2-4). The structures of ammonia dimmer and tetramer cations were determined on the basis of their IR spectra and DFT calculation results.