VIBRATIONAL PREDISSOCIATION SPECTROSCOPY OF THE $(H_2O)_n^-$ n=6-21 CLUSTERS IN THE OH STRETCHING REGION: EVOLUTION OF THE EXCESS ELECTRON-BINDING SIGNATURE INTO THE INTERMEDIATE CLUSTER SIZE REGIME

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We report vibrational predissociation spectra of the $(H_2O)_n^-$ cluster ions in the OH stretching region to determine whether the spectral signature of the electron-binding motif identified in the smaller clusters continues to be important in the intermediate size regime (n=7-21). This signature consists of a redshifted doublet that dominates the OH stretching region, and has been traced primarily to the excitation of a single water molecule residing in a double H-bond acceptor (AA) binding site, oriented with both of its H atoms pointing toward the excess electron cloud. Strong absorption near the characteristic AA doublet is found to persist in the spectra of the larger clusters, but the pattern evolves into a broadened triplet around n=11. A single free OH feature associated with dangling hydrogen atoms on the cluster surface is observed to emerge for n=15, in sharp contrast to the multiplet pattern of unbonded OH stretches displayed by the $H^+\cdot(H_2O)_n$ clusters throughout the n=2-29 range.