

Abstract Submitted
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Mass-selective resonance enhanced two-photon ionization laser spectroscopy of hydrated biomolecules PENGQIAN WANG, Department of Physics, Western Illinois University — The various functions of biomolecules are essentially determined by their geometric and energetic structures. Because of the ubiquitous presence of water in living organisms, biomolecules are often hydrated with water molecules, which crucially influence the functionality of the biomolecules. We study the structure and dynamics of mono- and poly-hydrated biomolecules by mass-selective resonance enhanced two-photon ionization laser spectroscopy. A tunable ultraviolet laser is used to excite the hydrated clusters, and a second photon is used to ionize the clusters. The resultant ions are measured by a mass spectrometer. The vibrational structures of the hydrated biomolecules are obtained by comparing the experimental spectra with the results of advanced ab initio quantum chemical calculations. We plan to apply this technique to explore the nucleobases, which are the fundamental building blocks of DNA and RNA molecules. This study provides valuable information on the binding properties of the water molecules around the central biomolecules, as well as on the changes of the structure and tautomeric equilibrium of biomolecules in an aqueous environment. Project supported by the WIU-URC grant.

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