

ACTION SPECTROSCOPY STUDY OF (H₂O-X)⁺ COMPLEXES IN THE OVERTONE RANGE

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H₂O⁺ plays a role in the ion chemistry of the lower atmosphere and acts as a nucleation center¹. In this talk I will present new results concerning (H₂O-X)⁺ complexes, with X = Ar, CO₂ and N₂O. These complexes are produced using a supersonic expansion and an electron beam. Photo-fragmentation spectroscopy is performed with an OPO laser in the near-IR (1000-2100 nm) and by monitoring the signal of H₂O⁺ fragments as a function of the laser wavelength. New vibrational bands will be reported. The results concerning (H₂O-Ar)⁺ will be compared with previous results obtained in the literature². Tentative assignment of the observed bands will be performed by a careful comparison between the different complexes. Finally, I will present the status of our efforts in the production of very large ionic clusters, with pure (Ar)_n⁺ and mixed clusters (H₂O_m-Ar_n)⁺ containing up to thousands of units.

¹[doi:10.1021/cr5003479](https://doi.org/10.1021/cr5003479), Shuman, N. S., Hunton, D. E., & Viggiano, A. A. (2015). Ambient and modified atmospheric ion chemistry: From top to bottom. *Chemical reviews*, 115(10), 4542-4570.

²[doi:10.1063/1.4998419](https://doi.org/10.1063/1.4998419), Wagner, J. P., McDonald, D. C., & Duncan, M. A. (2017). Near-infrared spectroscopy and anharmonic theory of the H₂O+ Ar_{1, 2} cation complexes. *The Journal of chemical physics*, 147(10), 104302.