ACTION SPECTROSCOPY STUDY OF $(H_2O\text{-}X)^+$ COMPLEXES IN THE OVERTONE RANGE

J. FRÉREUX, B. TOMASETTI , G. VANLANCKER , A. DELCORTE , X. URBAIN and C. LAUZIN, *Institute of Condensed Matter and Nanosciences, Université catholique de Louvain, B-1348 Louvain-la-Neuve, Belgium*

H_2O^+ plays a role in the ion chemistry of the lower atmosphere and acts as a nucleation center[1]. In this talk I will present new results concerning $(H_2O\text{-}X)^+$ complexes, with X = Ar, CO_2 and N_2O. 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 H_2O^+ fragments as a function of the laser wavelength. New vibrational bands will be reported. The results concerning $(H_2O\text{-}Ar)^+$ will be compared with previous results obtained in the literature[2]. 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 $(H_2O_m\text{-}Ar_n)^+$ containing up to thousands of units.

[1] doi: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, Wagner, J. P., McDonald, D. C., & Duncan, M. A. (2017). Near-infrared spectroscopy and anharmonic theory of the H2O+ Ar1, 2 cation complexes. The Journal of chemical physics, 147(10), 104302.