INFRARED SPECTROSCOPY OF $H_3O^+(N_2)_n$ (n=1,2,3) COMPLEXES

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Gas phase $H_3O^+(N_2)_n$ (n=1,2,3) complexes are produced in a pulsed electrical discharge supersonic expansion source. Infrared spectra of the cold species are obtained via infrared photodissociation spectroscopy. Theoretical investigations have been employed to probe the structures of these complexes. The infrared spectroscopy (2400-3800 cm^{-1}) of these complexes will be discussed. For the n=1 complex, the broad peak around 2785 cm^{-1} is attributed to the shared proton stretch. Partially resolved rotational structure is also observed in the water stretch region. Rotational simulation of the spectrum reproduced the experimental spectrum with the rotational temperatures J=40K and K=25K. The rotational structure is quenched for the n=2 and 3 complexes as the free rotation of the water is hindered due to the presence of nitrogen.