ADDITION OF WATER TO AMMONIA-HYDROGEN HALIDE COMPLEXES: MOVING TOWARDS PROTON TRANSF ER

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Proton transfer in the ammonia-hydrogen halides serves as a prototypical acid-base reaction. Understanding the role of water in facilitating these types of reactions is important for both atmospheric chemistry and solution chemistry. Gas-phase and matrix experiments[a] show that the proton remains attached to the halogen in anhydrous complexes for HF, HCl, and HBr. However, recent theoretical calculations[b] have shown that the proton transfer proceeds with the addition of from one to three water molecules, for HBr, HCl, and HF, respectively. To study this reaction we have initiated a set of experiments where we sequentially add water molecules to preformed ammonia-hydrogen halide complexes inside helium droplets. Observation of the vibrational frequencies along with estimates of the dipole moments help to determine if proton transfer has taken place.

[a]Barnes, A.; Legon, A., *J. Mol. Struct.*, **1998**, 101.
[b]Snyder, J.; Cazar, R.; Jamka, A.; Tao, F-M, *J. Phys. Chem.*, **1999**, 7719.