SOLVATION OF HCl, AGGREGATION OF H_2O, HCl AND THEIR DEUTERATED ISOTOPES IN SUPERFLUID He DROPLETS[a]

GERHARD W. SCHWAAB, OZGÜR BIRER, ANNA GUTBERLET, MARKUS ORTLIEB, MARTINA HAVENITH, *Department of Physical Chemistry II, Ruhr-University Bochum, Universitätsstr. 150, D-44780*.

We investigate aggregates of HCl, H_2O and their deuterated isotopes embedded in superfluid helium using a helium nanodroplet spectrometer combined with a cw infrared OPO set up with an output power of up to 2.7 W and a resolution of better than 0.001 cm^{-1}. Depletion spectra of the super cooled aggregates (0.37 K) were recorded between 2650 cm^{-1} and 2720 cm^{-1}. We were able to assign the HCl stretch vibration of the HCl-H_2O complex. We also observed spectral features of $(HCl)_m(H_2O)_n$ aggregates and isotopes in the region of the H_3O^+ stretch vibration. The question of how many H_2O molecules are needed to solvate HCl will be addressed.

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