PYRIDINE AGGREGATION IN HELIUM NANODROPLETS

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Pyridine crystals show the unusual property of isotopic polymorphism. Experimentally it has been observed that deuterated pyridine crystals exist in two phases while non-deuterated pyridine does not show a phase transition[a]. Therefore, although isotopic substitution is the smallest possible modification of a molecule it greatly affects the stability of pyridine crystals. A possible experimental approach in order to understand this striking effect might be the study of pyridine aggregation for small clusters. By embedding the clusters in helium nanodroplets the aggregates can be stabilized and studied by means of Infrared Depletion Spectroscopy.
Pyridine oligomers were investigated in the C-H asymmetric vibration region (2980-3100 cm^{-1}) using this experimental technique. The number of molecules for the clusters responsibles for each band were determined by means of pick-up curves as well as mass sensitive depletion spectra. Furthermore, the intensity dependence of the different bands on applying a dc electric field was studied. The assignment of the different structures for pyridine clusters on the basis of these measurements were also carried out.

[a] S. Crawford *et al.*, Angew. Chem. Int. Ed., 48, 755 (2009).