INFRARED DEPLETION SPECTROSCOPY OF THE ANILINE-WATER-TOLUENE CLUSTER CATION AND MODE SELECTIVE PREDISSOCIATION OF THE HYDROGEN BONDS.

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The vibrational spectrum of the ternary cluster cation of aniline-water-toluene in a supersonic jet has been measured by infrared depletion method in the NH and OH stretching region. Three bands were observed at 3722, 3634 and 3295cm^{-1}. The analysis of the vibrational spectrum showed that two NH bonds of aniline interact with water and toluene in the cluster cation. The band at 3295cm^{-1} was assigned to the stretching vibration of NH of aniline cation interacting with toluene, whereas other two bands were assigned to the symmetric and anti-symmetric stretching vibrations of free OH of water.
When the cluster absorbs the infrared photon, it dissociated into two fragments. There are two possible dissociation path of this cluster.
1) $AWT^+ \rightarrow AW^+ + T$ and 2) $AWT^+ \rightarrow AT^+ + W$
The branching ratio of this reaction AW^+/AT^+ was measured for three different bands, and we obtained 0.49 for the NH stretching vibration and 0.37 and 0.38 for the OH stretching vibrations. This results suggest that there is a fast energy transfer from the NH stretching vibration to the hydrogen bond between NH and toluene which enables the vibrational mode dependence of the predissociation.