MEDIUM AND TEMPERATURE EFFECTS ON THE IR-SPECTRA OF ACETIC ACID-PYRIDINE COMPLEX

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Acetic acid-pyridine complex is a strongly hydrogen bonded complex exhibiting the features typical for H-bonding structure, even in polar solvents (ϵ=1.9-8.93). The IR-spectra (4000-1500 cm^{-1}) of such a complex in the gas phase and solutions with different polarity have been recorded within the temperature range 293-395K. νOH and νC=O frequencies of the acetic acid dimer in the gas phase are close to that expected for the complex. Nonetheless, we have successfully separated these bands.

Considerable changes in νOH band parameters of the complex due to transition into the solvent have been observed: low frequency shift of the νOH band as a whole, significant relative increase of intensity in the region 2500 cm^{-1} and appearance of a broad absorption in the region 1900 cm^{-1}. Increasing the solvent polarity as well as decreasing the temperature also leads to the low frequency shift of νOH band. All these changes show the essential strengthening of the H-bond upon transition to condensed phase and increasing of solvent polarity. Calculations based on perturbation theory confirm the experimentally obtained results. In addition, comparative study of the changes of the first moment in solutions for the complexes and acetic acid dimer has been carried out.

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