

MICROSOLVATION OF BUILDING BLOCKS

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Laser ablation molecular beam Fourier transform microwave spectroscopy LA-MB-FTMW has provided the first observation of the rotational spectra of the glycine-H₂O complex.^a As a continuation of this work we present the study of monohydrated complexes of alanine, uracil and thymine and the first observations of the dihydrated clusters glycine-(H₂O)₂ and alanine-(H₂O)₂. For the microsolvated amino acids only the conformer with *cis*-COOH configuration and bifurcated NH₂ ···O=C H-bond has been observed. Both alanine-H₂O and glycine-H₂O have similar shapes: the water molecule being bonded through two O-H ···O hydrogen bonds to the carboxylic group of the amino acid. The dihydrated clusters have also comparable structures where the two water molecules form a cycle with the COOH group through sequential H-bonds. The rotational spectra of uracyl-H₂O and thymine-H₂O show the same complexity than those of the bare molecules^{b,c} due to the hyperfine structure of two quadrupolar ¹⁴N atoms. The detected conformers show comparable structures with the water molecule bonded through two N-H ···O and O-H ···O=C hydrogen bonds to the N bases. The structure of hydrogen bond has been investigated by isotopic substitution.

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