MICROWAVE SPECTROSCOPY OF BIOMOLECULAR BUILDING BLOCKS

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Abstract Microwave spectroscopy is considered to be the most definitive gas phase structural probe, due to its ability to distinguish between different conformational structures of a molecule, because of the unique spectroscopic constants of each structure, giving rise to distinct individual rotational spectra.
Previously, application of this technique was limited to molecular specimens possessing appreciable vapor pressures, thus discarding the possibility of studying many other molecules of biological importance, in particular those with high melting points, which had a tendency to undergo thermal reactions, and ultimately degradation, upon heating.
Nowadays, the combination of laser ablation with Fourier transform microwave spectroscopy techniques, in supersonic jets, granted the gas-phase study of such systems. In this lecture, these techniques[1], including broadband spectroscopy[2], as well as results of their application into the study of the conformational panorama and structure of biomolecular building blocks, such as amino acids[3], nucleic bases[4], and monosaccharides[5], shall be briefly discussed, and with them, the tools for conformational assignation – rotational constants, nuclear quadrupole coupling interaction and dipole moment.

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