

FOUR STRUCTURES OF TARTARIC ACID REVEALED IN THE GAS PHASE

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The tartaric acid, one of the most important organic compounds, has been transferred into the gas phase by laser ablation of its natural crystalline form (m.p.174°C) and probed in a supersonic expansion by chirped-pulse Fourier transform microwave spectroscopy (CP-FTMW). Four stable structures, two with an extended (trans) disposition of the carbon chain and two with a bent (gauche) disposition, have been unequivocally identified on the basis of the experimental rotational constants in conjunction with ab initio predictions. The intramolecular interactions that govern the conformational preferences are dominated by cooperative O-H...O=C type and O-H...O hydrogen bonds extended along the entire molecule. The observation of only μ_c - type spectra for one “trans” and one “gauche” conformers, support the existence of a C₂ symmetry for each structure.