

Probing biomolecular structure and behavior with Raman optical activity

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Raman optical activity (ROA) measures the small difference in Raman scattering from chiral molecules using right- and left-circularly polarized light, and combines high sensitivity to stereochemistry and molecular composition. As a result, ROA has become a powerful probe of the conformation and behaviour of a wide range of biological molecules. After a short introduction to the technique, this talk will present recent results from a number of studies that illustrate the ability of ROA to provide detailed and novel information on complex biological systems. These include both experimental and quantum mechanics/molecular dynamics investigations into:

- i) natural product characterization,
- ii) microsolvated states of a charged amino acid (histidine),
- iii) carbohydrate structure and the role of solvation in the conformational dynamics of sugars,
- iv) glycoprotein organisation, and
- v) peptaibol interactions with lipid membranes.

Chirality plays a critical role in many biological processes, and the techniques developed during these studies have the potential to open new opportunities for ROA spectroscopy in understanding diverse complex biomolecules.

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