Prof. Satyen Saha*
Krishanu Bandyopadhyay, Abhineet Verma
Department of Chemistry, Institute of Science, Banaras Hindu University, Varanasi - 221005, India.
E-mail: satyen.saha@gmail.com, ssaha@bhu.ac.in

Raman Spectroscopy: Unveiling Its Versatility as a Scientific Tool

Raman spectroscopy provides detailed molecular and chemical information in a non-destructive manner, making it a powerful and versatile analytical tool in scientific research and various industrial applications. Raman can prove as a versatile tool for fundamental studies as well. In this oral presentation, I shall be highlighting some of our recent results using Raman spectroscopy: (**i**) for the first time to show the equilibrium among *transoid-cisoid* of NTf_2 anions considerably depending upon the alkyl chain length attached with cations (in nicotinamide ionic liquids(ILs)). (**ii**) To determine the type of water (DA, DDA, DDAA, or DAA), both qualitatively and quantitatively. (**iii**) It is used to understand the profound effect of water on the physical and chemical properties of ILs. (**iv**) Highlights the importance of water, considering that a considerable amount of water can creep in ILs during synthesis or from exposure to air. Lastly, (**v**), we have used temperature-dependent confocal Raman microscopic measurements to investigate the stability of water in a crystal environment (e.g., $[Cu(cyclam)(N_3)_2]\cdot 4H_2O$), which depicts the stability of liquid water up to 166 °C, well above the normal boiling point of water molecules. We anticipate that more investigations based on the confocal Raman microscopic technique to study small water clusters stable at high temperatures may prove useful to precisely locate water clusters deeply buried in soil samples of locations with extreme weather conditions. Such stable water at high temperatures may prove advantageous for searching/locating dormant life forms.

References

[1] **Satyen Saha***, A. Verma, K. Bandyopadhyay. *Journal of Raman Spectroscopy*, **2022**, 53(10), 1722.

[2] A. Verma, N. Bhuvanesh, J. Reibenspies, S. S. Sunkari. **Satyen Saha***, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, **2022**, 274, 121121.

[3] A. Verma, S. Verma, Monika, M. Mondal, N. E. Prasad, J. Srivastava, S. Singh, J. P. Verma, **Satyen Saha***. *Journal of Molecular Structure*, **2022**, 1250, 131679.

Figures

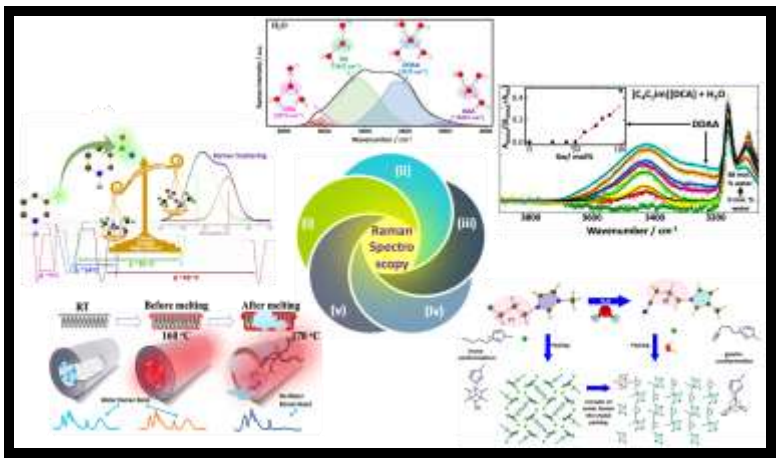

Figure 1: Raman spectroscopy shows its versatility in studies of various chemical systems.