

# The emerging interface of mass spectrometry with molecular and supramolecular materials

## Abstract

Mass spectrometry (MS), a powerful analytical technique, has gained profound importance for characterizing a wide variety of molecules, including proteins. Apart from revealing the molecular composition, advanced techniques such as ion mobility MS and tandem MS are used to probe structural details of molecules. However, the use of MS in materials science has remained limited. This seminar will focus on how the impact of MS, coupled with soft-ionization techniques, in understanding materials is strengthened through the advances in the science of ligated atomically precise metal nanoclusters (NCs). These NCs are an emerging class of materials with unique molecule like properties and are interesting due to their diverse applications in catalysis, sensing and biology. The use of high-resolution mass spectrometric techniques in understanding the chemical interactions of NCs that control their growth, structural dynamics, inter-cluster interactions and supramolecular interactions will be presented. Apart from studies on NCs, a second focus will be on the use of ion mobility MS in understanding supramolecular materials containing flexible macrocyclic molecules like cyclodextrins.

This seminar will conclude with future research directions on designing new types of functional materials with tunable optical and magnetic properties and applications for catalysis and sensor devices. The use of MS-based techniques to study such materials at the molecular level will also be described. Moreover, future aspects on the use of ion mobility MS, preparative MS techniques, and advanced methods for gas-phase ion chemistry will be discussed.

## References

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