

## **Seminar**

# **Confluence of Molecular and Nanomaterial Metal Phosphate Chemistry for Energy Applications**

**Ramaswamy Murugavel**

**IIT-B, Mumbai**

Reaction of phosphonic acids and phosphate monoesters with a divalent metal such as  $\text{Zn}^{2+}$  in a donor solvent (L) leads to the isolation of tetranuclear metal phosphates  $[(\text{R})\text{PO}_3\text{Zn}(\text{L})]_4$  (R = alkyl/aryl or alkoxy/aryloxy), whose inorganic core resembles the zeolitic D4R secondary building units (SBUs).<sup>1,2</sup> In recent times, we have unravelled that it is possible to isolate even larger SBUs through small variations in the reaction conditions.<sup>3</sup> On the other hand, the reactions of phosphoric acid esters yield either 1-D or 2-D materials which thermally anneal below 300°C to produce ceramic nanomaterials.<sup>4,5</sup> Rationalisation of building principles along with the use of this class of compounds for energy applications will be highlighted in this lecture.

### **References**

1. Murugavel & co-workers, *ACS Catalysis* **2023**, 13, 8535.
2. Murugavel & co-workers, *Inorg. Chem.* **2022**, 61, 6807 & **2020**, 59, 13233.
3. Murugavel & co-workers, *J. Am. Chem. Soc.* **2017**, 139, 39; *Chem. Commun.* **2019**, 55, 7994.
4. Murugavel & co-workers, *Angew Chem., Int. Ed.* **2019**, 16844; *Small*, **2020**, 1903334.
5. Murugavel & co-workers, *Chem. Mater.* **2024**, 36, 6475; *ACS Mater. Lett.* 2024, 6, 2126.

***Tuesday, Jul 22<sup>nd</sup> 2025***

***11:30 Hrs (Tea / Coffee 11:15 Hrs)***

***Auditorium, TIFRH***