

## **Seminar**

### **Fascinating Chemistry of Metal-Organic Framework (MOF) Glasses & Liquids**

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Metal-organic frameworks (MOFs) are widely recognized for their highly ordered crystalline structures, tunable design, permanent porosity, and versatile host-guest chemistry. This fascinating class of chemistry was awarded the 2025 Nobel Prize in chemistry. While the MOF research dominates the investigations in its crystalline form, the crystallinity is not a prerequisite. In recent years, interest in non-crystalline MOF systems like MOF glasses and liquids has garnered interest in transferring the designability and chemical diversity of crystalline MOFs to glassy and liquid states, which is unavailable in traditional organic, inorganic, and metallic glass formers. The MOF glasses are highly disordered amorphous materials that nevertheless preserve the underlying framework connectivity. Additionally, the phase transitions endow solvent-free processability, grain-boundary-free monoliths and often exhibit superior performance than crystalline counterparts. Parallely, the reversible phase transitions enable the fabrication of glass-ceramics and phase-change materials with novel applications like thermal energy storage, non-volatile data storage, and nonlinear optical devices. However, the glass-forming MOFs are rare and synthetically challenging and only a few amongst the pool of ~70,000 reported MOFs melt or form glasses. Alternatively, engineering the chemical and physical properties ( $T_g$ ,  $T_m$ ,  $T_d$ ,  $T_m-T_d$ , GFA, etc.) of glass is crucial to fully explore their functionalities. In my talk, I will present our efforts toward the understanding of melting and glass formation in MOFs and engineering functionalities.

***Tuesday, May 12<sup>th</sup> 2026***

***16:00 Hrs (Tea / Coffee 15:45 Hrs)***

***Auditorium, TIFRH***