

## **Internal Seminar**

### **Studying the Molecular Diffusion in Oriented Pillar-Layered Metal-Organic Framework Thin Films**

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Transport diffusivity of molecules in a porous material is restrained by the rate at which molecules move from one pore to the other, along the concentration gradient, i.e. by following Fickian diffusion. In heterogeneous porous materials, i.e. in the presence of pores of different sizes and chemical environments, diffusion rate and directionality remain tricky to estimate and adjust. To experimentally determine this complex diffusion rate dependency and get insight of the microscopic diffusion pathway, we have designed model nanoporous structure, pillar-layered metal-organic framework (PLMOF). In our model structure two chemically and geometrically distinct pore windows are spatially oriented by an epitaxial, layer-by-layer growth method and quantitative mass uptake rate measurements have indicated that the mass uptake is governed by the interpore diffusion. This revelation allows chemically carving the nanopores, and accelerating the interpore diffusion and kinetic diffusion selectivity.

***Wednesday, Oct 11<sup>th</sup> 2023***

***02:30 PM***

***Venue: Class Room - 4***