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#ICMolTalks

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December 16th - 11:30h

Seminar SS6, ICMol

Abstract

From discrete molecules to porous molecular 2D materials

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Metal–organic polyhedra (MOPs) and metal–organic cages (MOCs) have emerged as promising porous materials that complement classical metal–organic frameworks (MOFs). Their discrete molecular nature, held together by relatively weak intermolecular interactions, endows them with superior processability compared to extended frameworks. This feature enables their assembly into a wide variety of hierarchically porous materials while preserving the intrinsic porosity of their internal cavities and introducing additional porosity in the solid state.
The spatial arrangement of self-assembled MOPs/MOCs is crucial to maintaining long-range order and enabling cooperative behavior. Therefore, well-organized arrays or tessellations based on these discrete molecular units are essential for ensuring the stability and crystallinity of the materials, even under challenging structural observations such as transmission electron microscopy (TEM). In this lecture, the molecular design and self-assembly strategies of discrete metal-organic molecules will be

Biography

Javier Lopez-Cabrelles is an Assistant Professor at the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University, whose research centers on porous discrete molecules and low-dimensional materials. He received his B.Sc. in Chemistry and M.Sc. in Molecular Nanoscience and Nanotechnology from the University of Valencia, where he later completed his Ph.D., earning the Extraordinary Doctoral Thesis Award for his work on molecular materials and magnetic 2D coordination polymers. He joined iCeMS as a JSPS Postdoctoral Fellow in 2021 and subsequently held competitive fellowships, including the Margarita Salas and APOSTD programs. In December 2024, he was appointed Assistant Professor at Kyoto University, where he continues to develop innovative approaches to molecular self-assembly and metal-organic frameworks.

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