Horike - Furukawa Group Seminar

Date

April 22nd, 2025
15:30–17:30

Venue

Kyoto University, KUIAS
(iCeMS Main Building)

2F Seminar Room
(#A207)

Registration

https://forms.gle/aqTe1RqYrWt9CcdG8

Contact

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From electrically conductive MOFs to sustainable batteries

Prof. Mircea Dincă

Princeton University, USA
Department of Chemistry

Abstract

The emergence of electrically conductive metal-organic frameworks (c-MOFs) has been one of the most paradoxical developments in the field in the last few years. Indeed, how can one transport charges through a material that is mostly "empty" space? In this sense, MOFs made from layers of organic ligands connected by (typically) square-planar metal ions have shown particularly good electrical conductivity. However, a precise mechanism for charge transport is still the subject of debate, with various experimental and computational reports describing these materials as metals, semiconductors, or semimetals. This lecture will describe the latest efforts from our group to understand the intrinsic properties of 2D c-MOFs, especially as related to single-crystal electrical measurement studies, and will discuss in particular the unexpectedly large influence of out-of-plane transport. The seminar will also discuss how these fundamental studies have led directly to the discovery of a sustainable, organic cathode material that is competitive with incumbent oxides in Li-ion and Na-ion rechargeable batteries.

Novel applications of novel porous materials in catalysis

Prof. Christian Doonan

The University of Adelaide, Australia
Department of Chemistry

Abstract

The rational synthesis of heterogeneous catalysts is a long-standing challenge in materials science. Our research group has focused on the design and development of framework materials as new platforms for catalysis as they offer molecular-level control of active site architectures. This talk will cover our work on how we have employed these materials for small molecule conversion.