東京大学グローバルCOEプログラム　機械システム・イノベーション国際拠点

東京大学 THE UNIVERSITY OF TOKYO

GMSI Global Center of Excellence for Mechanical Systems Innovation

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Microporous Metal-Organic Frameworks: Opportunities in Energy Research

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日時：2013年3月4日(月)　16:00-17:00

会場：東京大学工学部5号館3階談話室(341号室)

要旨

Metal-organic frameworks (MOFs) are crystalline solids made from inorganic nodes and bridging organic ligands, which together define highly ordered and monodisperse micropores with diameters ranging from 0.5 to ~ 2 nanometers. The micropores are responsible for unprecedented surface areas occasionally exceeding 5000 m^2/g, making MOFs popular choices for energy applications in gas storage or separation as well as potentially energy storage. The crystalline nature of these materials also makes them attractive candidates for studying photophysical phenomena in ordered and/or confined organic chromophore aggregates and for heterogeneous catalysis with small molecule substrates. In this context, I will discuss our progress in understanding the influence of conformation locking on the photophysics of rotor molecules such as tetraphenylethylene and the influence of supramolecular organization on the electronic properties of tetrathiafulvalene-based MOFs, culminating with the presentation of the first MOF with high charge mobility. The idea of using MOFs as bona-fide chelating ligands that enforce unusual coordination environments, electronic structure, and potential reactivity around first-row transition metals will also be discussed in the context of our recent results of metal-ion mobilization within the well-known material $Zn_4O(BDC)_3$ (MOF-5). Finally, advances towards electrochemical membrane processing of MOFs for industrial applications such as gas separation will be presented.

主催：　東京大学グローバルCOEプログラム「機械システム・イノベーション国際拠点」

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