Metal-Organic Frameworks and their Applications to Clean Energy

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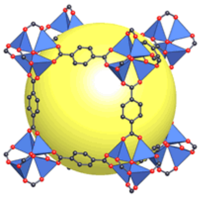
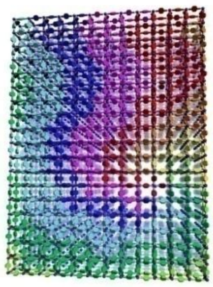
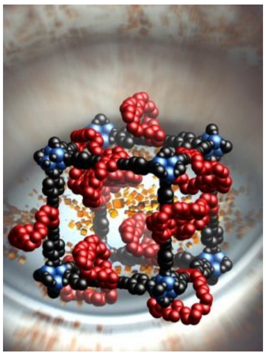
Abstract

Metal-organic frameworks (MOFs) represent an extensive class of porous crystals in which organic 'struts' are linked by metal oxide units to make an open networks. The flexibility with which their building units can be varied and their ultra-high porosity (up to 10,000 m^2/g) have led to many applications in gas storage and separations for clean energy production, to mention a few. This lecture will focus on how one can design porosity within MOFs to affect highly selective separations (carbon dioxide), storage (hydrogen and methane) and molecular recognition. The lecture will outline a new concept involving the design of a 'gene'-like sequences in MOFs that code for specific separations and chemical transformations.







References:

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[2] Colossal cages in zeolitic imidazolate frameworks as selective carbon dioxide reservoirs, B. Wang, H. Furukawa, M. O'Keeffe, O. M. Yaghi, *Nature*, 2008, *453*, 207-212.