

# Designable porous materials – Metal-organic frameworks

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Well-designed metal–organic hybrid framework materials—so-called metal-organic frameworks (MOFs) or porous coordination polymers (PCPs)—can be fabricated from a stochastic assembly of organic linkers with metal ions through the formation of coordination bonds. One of the most characteristic features of MOFs is a modularity, in which the components of organic linkers and metal cluster can be replaced with other similar molecules with maintaining the overall framework structure. This character allows us to design the materials for specific targets, in particular for applications in gas storage, separation, catalysis, molecular sensing and delivery of bioactive molecules. Recently, besides this molecular chemistry approach, we found an orthogonal strategy to enhance the materials' property so-called, mesoscopic chemistry approach, in which the size and morphology of MOF crystals can change their property with keeping the property arisen from inherent molecular nature. In this presentation, I will summarize the advantages of MOFs for future applications in environments, energy and health.