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Kinetic Assembly of Porous Coordination Networks

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Because of the presence of intermolecular interactions during self-assembly, there are many metastable structures before reaching the thermally most stable structure. By controlling the weak intermolecular interactions, we can trap various metastable coordination networks which will not be obtained by conventional thermodynamic control like solvothermal synthesis. In sharp contrast to the thermodynamic synthesis of coordination networks, kinetically trapped metastable networks were not paid much attention, because firstly it is very difficult to analyse crystal structures. Recently we have demonstrated that it is possible to perform ab initio powder structure determination of porous coordination networks using low resolution data.[1-3] In addition, we elucidated that totally different coordination networks can be selectively prepared using the same starting materials by thermodynamic and kinetic control.[4,5] In this talk, we will introduce selective preparation of metastable porous networks by kinetic control, the chemistry of porous networks, their unique sorption properties, redox properties, and X-ray snapshots of chemical transformation in a pore.[6-9]

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