

*Metal - organic frameworks with multi-components in order*

Qiaowei Li<sup>1</sup>, Binbin Tu<sup>1</sup>

<sup>1</sup>Department Of Chemistry, Fudan University, Shanghai, China

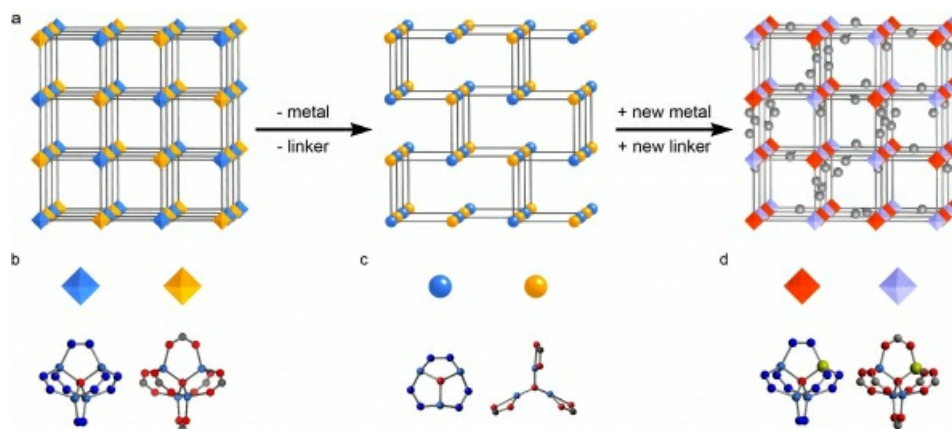
E-mail: qwli@fudan.edu.cn

Aiming for multi-functions of the materials, metal-organic frameworks (MOFs) with multiple components can be assembled from multiple inorganic and organic building units. However, it remains a challenge to further increase the number of components in one single framework, due to the difficulties in designing structures in which all components can participate in order and the complications in avoiding the exponentially increased possibilities of obtaining unwanted mixed phases.

In this talk, we will report the creation of ordered metal vacancies and linker vacancies in a cubic MOF by symmetry guided removing the metal ions and the linkers. By filling the vacancies with new metals and new linkers, new single-crystalline MOFs with multi-components (two metals and two linkers) in absolute order are introduced. Furthermore, a multi-component MOF structure was prepared from three kinds of SBUs, which are 3-, 5-, and 6- connected vertices, by topological induction. Recently, by incorporating Cu ion into the multi-component framework, we have shown that the valence of the Cu ion can be switched between Cu(I) and Cu(II) without destroying the framework. The redox activity of these open metal sites was further evidenced by H<sub>2</sub>O<sub>2</sub> decomposition, CO oxidation, and alcohol oxidation reactions.

[1] Tu, B.et al. (2014). J. Am. Chem. Soc. 136, 14465-14471.

[2] Tu, B.et al. (2015). J. Am. Chem. Soc. 137, 13456-13459.



**Keywords:** [multi-component](#), [heterometallic](#), [redox-active](#)