Compromising conflicted spatial-arrangements of two mixed linkers in metal–organic frameworks

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Structural features and components of metal–organic frameworks (MOFs) are closely related to their properties. Therefore, the ability to control the structure of MOFs is important to develop superlative MOFs with desired properties. However, designing an MOF with desired structure and cell lattice is challenging due to the lack of fundamental understanding on the fine-tuning of the MOF structures. Herein, we demonstrate a strategy to control the MOF's structure by merging two MOF structures into a single MOF. The two coexisting organic linkers, benzene-1,4-dicarboxylate (BDC^{2-}) and naphthalene-1,4-dicarboxylate (NDC^{2-}), have conflicting spatial-arrangement preferences within an MOF structure, Kagomé and square lattices, respectively. Depending on the relative contributions of the two linkers during MOF construction, the final MOF structures are determined; and the competitive influence between BDC^{2-} and NDC^{2-} is effectively regulated to produce specific MOF structures with a Kagomé or rhombic lattice. In particular, MOFs with rhombic lattices have specific lattice angles by compromising conflicted spatial-arrangements of two mixed linkers.[1]

Reference

[1] Lee G et al. Structural Compromise Between Conflicted Spatial-Arrangements of Two Linkers in Metal–Organic Frameworks. Small Methods. 2023:2201586.