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Chiral crystalline sponges: absolute structure determination of chiral guests

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Enantiomers of optically active molecules often display vastly different chemical and biological activities. This is particularly important for pharmaceutical industry where nearly half of the active pharmaceutical ingredients (APIs) are chiral compounds.1 As a result, reliable analysis of their handedness has paramount importance to establish structure-activity relationship. Several chromatographic, and spectroscopic methods have been implemented in the literature for absolute structure determination of chiral compounds. However, single crystal X-ray diffraction (SC-XRD) remains one of the most dependable methods.2 Unfortunately, this method compels the pre-existence of heavy atoms in molecular scaffold and also a pre-condition of crystallization of the chiral compound for reliable analysis. To overcome these problems, Fujita group recently developed the 'crystalline sponge method', which is an analytical tool for the micro-to-nanogram scale X-ray structure analysis of non-crystalline compounds. Additionally, presence of heavy atoms in the parent framework enhances the likelihood of crystalline sponges for absolute structure determination.3 In this work, we designed new crystalline sponges with pre-installed chiral internal references either as chemical substituents or guest molecules within their porous network and further these 'chiral crystalline sponges' were utilised for the reliable structure elucidation of chiral guest compounds.

References
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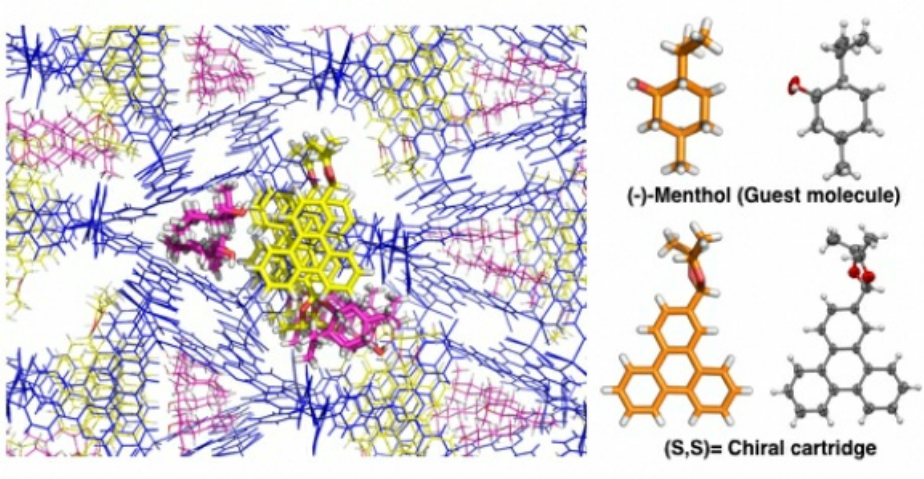

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