Metal-organic crystals: shaping, uniformity and symmetry breaking

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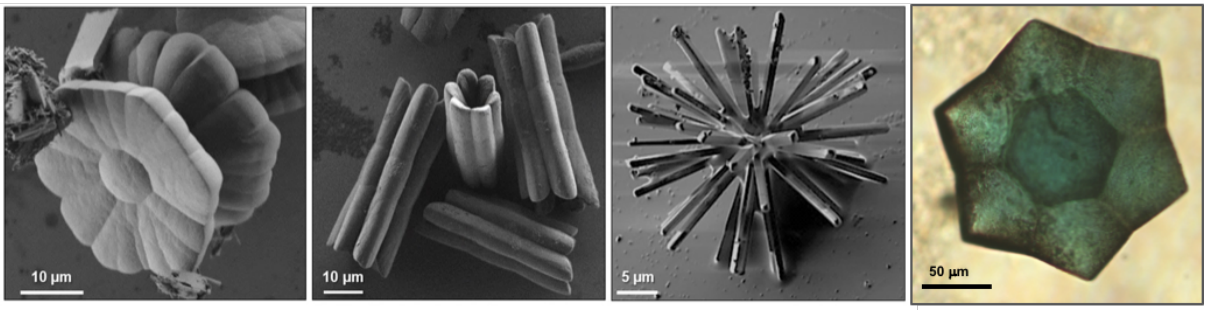
The relationship between crystallization conditions, crystal structure and properties is a pivotal point in chemistry both for the investigation of fundamental aspects and for applications. The interest spans from the macro- to the nanoscale and the range of natural, laboratory-made, organic and inorganic systems. [1] Typically, micro-nano crystals grown by additive-free synthesis are polydisperse in size, exhibit non-homogeneous shape or common polyhedral morphologies.

We have developed a new additive-free synthesis that results in the formation of monodispersed crystals with a large variability of morphologies, while keeping the crystallographic structure nearly identical. [2-5] The set of crystals generated include rare polyhedral shapes, hollow, chiral and paradoxical single crystals that are not classifiable according to conventional rules (Figure).

Our work provides new fundamental insights into the growth of chiral crystals and aggregates, opening up opportunities for their use as 3D objects for nanotechnological applications.



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