METAL-ORGANIC CRYSTALS: SHAPING, UNIFORMITY AND SYMMETRY BREAKING

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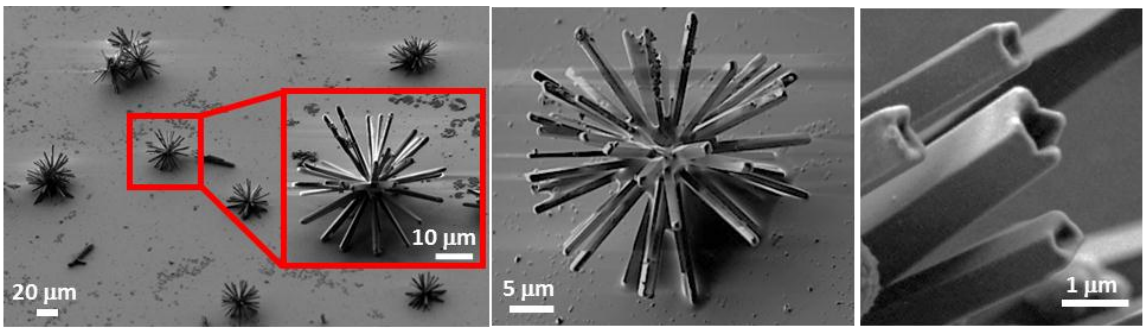
The relationship between crystallization conditions, crystal structure and properties is a pivotal point in chemistry both for the investigation of fundamental aspects and for applications. The interest spans from the macro- to the nanoscale and the gamut of natural, laboratory-made, organic and inorganic systems.

In our study, we investigate the factors affecting the dimension and morphology of metal-organic crystals.[1] Typically, micro-nano crystals grown by additive-free synthesis are polydispersed 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] The set of crystals generated include rare polyhedral shapes, hollow structures and unique morphologies not classifiable according to conventional rules. Interestingly, we prepared morphologically highly complex crystals from achiral components that exhibit single crystallinity and chirality at both the molecular structure and crystal morphology.

Moreover, metal-coordination chemistry was also exploited for the formation of superstructures assembled from organic tubular crystals (Figure).[3]

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



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