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.[1]

In our study, we investigate the factors affecting the dimension and morphology of metal-organic crystals. 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 paradoxical morphologies that are not classifiable according to conventional rules.[2,3] Metal-coordination chemistry was also exploited for the formation of superstructures assembled from organic tubular crystals.[4]

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

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