## **Crystals and Thin Films Made at the Weizmann Institute**

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Enabling and understanding new methodologies to fabricate molecular assemblies driven by intermolecular interactions is fundamental in chemistry. Coordination chemistry can be used to control crystal growth and enables surface-confinement of molecular materials, which remains challenging. Coordination-based polymers and metal-organic frameworks (MOFs) have been explored since their discovery at the beginning of the 18<sup>th</sup> century. Such materials are generated by the dozens in a gold-rush-type search for properties mainly related to the storage and release of energy (e.g., hydrocarbons, dihydrogen). How the molecular components, metal salts and experimental conditions control the dimensions, shapes, chirality and homogeneity of these materials is barely known. Using achiral ligands that binds late-transition metals in a defined manner, we address issues related to the mechanism underlying the formation of hollow and chiral structures. In this overview, the formation and properties of coordination-based films and a solvent-free on-surface crystalto-co-crystal conversion process. This stepwise vapor-based approach offers a new strategy for the formation of hybrid supramolecular materials