

## KINETIC CONTROL IN THE SURFACE ASSEMBLY OF ONE-DIMENSIONAL COORDINATION POLYMERS

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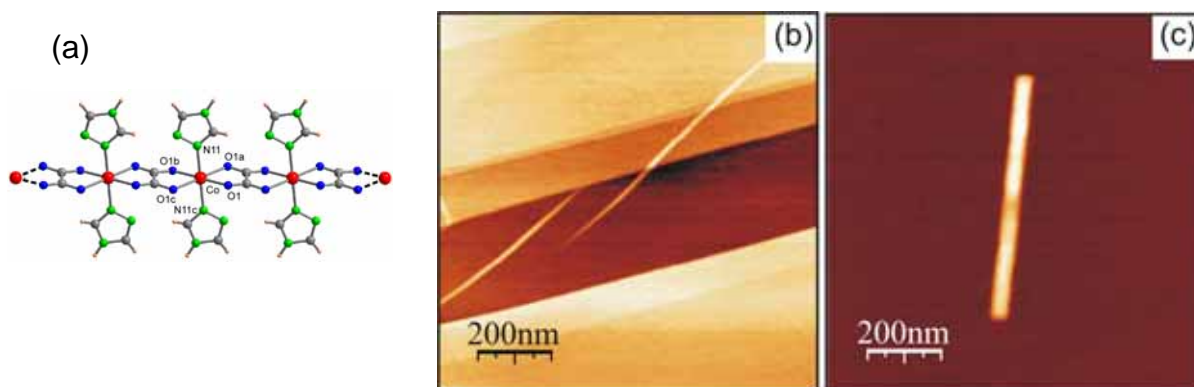
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A key issue in nanotechnology is the fabrication of nanoscale structures built up from functional blocks in a reproducible and efficient way. In this sense, coordination polymers on solid surfaces, also named metal-organic frameworks, are considered a promising candidate in view of their applications due to their interesting electrical, and magnetic properties, as well as host-guest interactions [1-3]. The practical application of these new materials requires controlling the nanoscale spatial order of the constituent blocks. The principles of the supramolecular chemistry allow, in many cases, controlling the architecture and dimensionality of the materials through the self-assembling of different molecular building blocks. The suitable selection of the building blocks may also predict some of their final properties. In this bottom-up approach, kinetics can also play an important role in the nanostructuring of these compounds on surfaces, which implies well understanding of the multiple and competing interactions (hydrogen bonds, coordination bonds, van der Waals forces,...). The knowledge of the dynamic processes that take place during the assembly of the nanostructures is an open topic with fundamental interest to the emergent nanoscience.

Here we show for first time the surface assembly of one-dimensional coordination polymers prepared from vapour phase (Fig. 1). The assembly phenomenon is based on the reversibility property of the coordination bonds of those compounds, which allows the polymers to be sublimated in form of small oligomers and reassembled forming different surface structures once on the substrate. Temperature-controlled transition to the one-dimensional morphology reflecting its equilibrium structure is observed and explained in terms of kinetically-limited anisotropic interactions between the oligomers. These results open a new way to the surface assembly of coordination frameworks.



**Figure 1:** (a) Structural representation of the 1D coordination polymer  $[\text{Co}(\text{ox})(\text{Htr})_2] \cdot 2\text{H}_2\text{O}$ . (b, c) AFM images showing one-dimensional structures of this compound on HOPG (a) and mica (b) grown by sublimation in a high vacuum system.

**References:**

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