2. Self-assemblies and new hybrid architectures

Hybrid self-assemblies nanoparticles-organic molecules for charge transport

We used ultra-small Pt (~ 1.5 nm) nanoparticles (NPs), stabilized only by CO, which had been used as a reducing gas, and THF, which was the solvent. It is therefore possible to bind any ligand in a chosen quantity. We used thiols that coordinate strongly with the surface of the NPs. Superstructures in the form of micrometric rods are then formed by aggregation of the NPs (Fig. 1). A great part of the work was devoted to the study of the charge transport in these assemblies (Mater Horiz 2017). We showed the presence of a Coulomb blocking at room temperature thanks to the use of ultra-small NPs. This work was done in collaboration with the MPC group which performed theoretical calculations. Transport measurements were carried out by the Nanomag group, as well as by P. Demont of CIRIMAT, Toulouse. Taking advantage of this work, we have developed a conductive AFM experiment with the LCC technical platform to perform nanometer-scale electronic transport measurements.

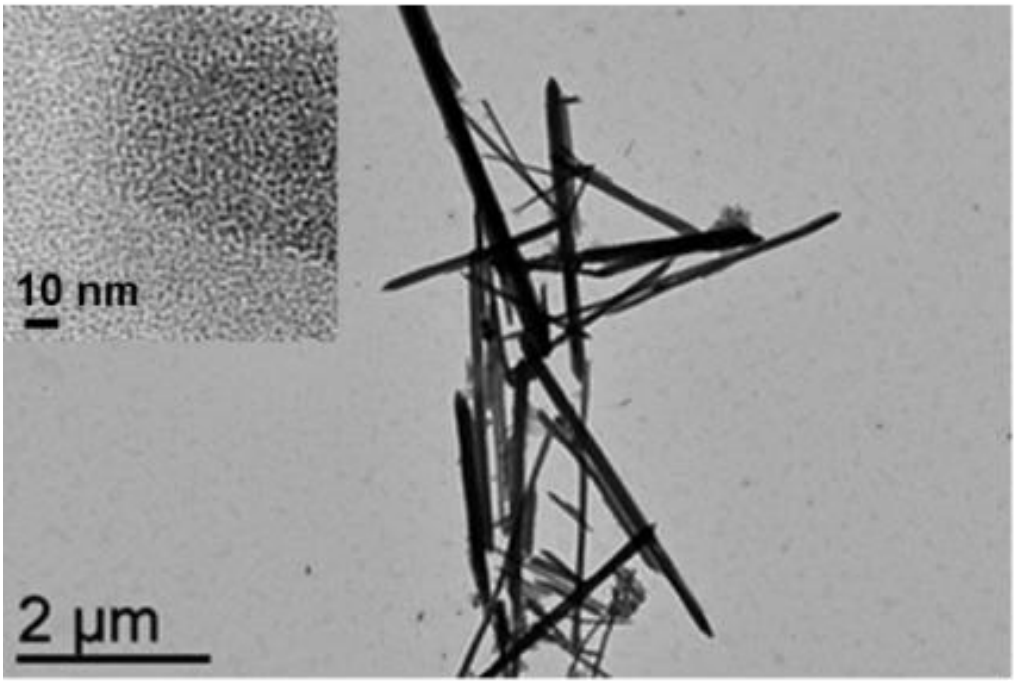

Fig. 1. Self-assemblies of ultra-small Pt NPs using thiols (mercaptobenzoic acid). Insert: zoom on a self assembly.