

Inorganic Nanocrystals obtained by Wet chemistry
Control of the composition, size, shape and self-organization into 2D and 3D superlattices

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Research in the field of nanoparticles has grown tremendously during the last two decades. Such inorganic nanocrystals are of interest for a variety of applications such as superparamagnets, semiconductors or catalysis. Thus it is important to have access to methods that give particles in the nanometer range with good control over size, shape and composition but also with the potential for controlled deposition on a solid support in superlattices. Depicted numerous study on these nanomaterials, the understanding of nanocrystal growth is not well defined.

We details here the first use of the liquid-liquid phase transfer to obtain either pure metallic Platinum or Palladium nanocrystals with a control of the size and shape but also magnetic nanoalloys, as CoPt, with a perfect control on the composition and size. We will emphasize on the parameters allowing control the growth process and then the physical characteristic of the inorganic nanocrystals. The low degree of size polydispersity allows these nanocrystals to self-assemble with a long-range ordering in 2D and 3D supra-crystals. According to the nanocrystal shape, simple cubic or face centered cubic supra-crystals are observed. It is remarkable to notice that well-faceted supracrystals with sizes of the order of 10 micrometers may be obtained.

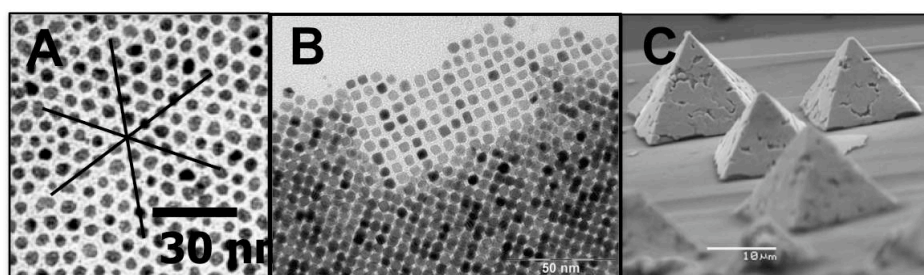


Figure 1: A) 2D self organization of spherical CoPt nanocrystals, B) Quadratic 2D organization of cubic Platinum nanocrystals, C) Pyramidal fcc superlattices on the micrometer scale of cuboocatedron platinum nanocrystals

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