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# Enhancing the magnetic anisotropy of maghemite nanoparticles via the surface coordination of molecular complexes

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## Abstract

Superparamagnetic nanoparticles are promising objects for data storage or medical applications. In the smallest-and more attractive-systems, the properties are governed by the magnetic anisotropy. Here we report a molecule-based synthetic strategy to enhance this anisotropy in sub-10-nm nanoparticles. It consists of the fabrication of composite materials where anisotropic molecular complexes are coordinated to the surface of the nanoparticles. Reacting 5nm g-Fe<sub>2</sub>O<sub>3</sub> nanoparticles with the [CoII(TPMA)Cl<sub>2</sub>] complex (TPMA: tris(2-pyridylmethyl)amine) leads to the desired composite materials and the characterization of the functionalized nanoparticles evidences the successful coordination-without nanoparticle aggregation and without complex dissociation-of the molecular complexes to the nanoparticles surface. Magnetic measurements indicate the significant enhancement of the anisotropy in the final objects. Indeed, the functionalized nanoparticles show a threefold increase of the blocking temperature and a coercive field increased by one order of magnitude.

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