

# The synthesis of Highly Crystalline and monodisperse maghemite and zirconia Nanocrystallites without size-selection process

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A new and simple method has been developed to synthesize highly crystalline and monodisperse maghemite ( $\gamma\text{-Fe}_2\text{O}_3$ ) and zirconia ( $\text{ZrO}_2$ ) nanocrystallites. High temperature aging of metal-surfactant complex was founded to generate monodisperse nanoparticles, wherein the nuclei were prepared by the thermal decomposition of iron-oleate complex in case of iron oxide and nonhydrolytic sol-gel reaction in case of zirconia respectively. By varying the experimental conditions, in other words concentration of surfactants, kind of metal precursor, reaction temperature and so on, the diameter of spherical nanoparticles could be controlled at various size. The synthesized nanoparticles were characterized by electron diffraction, X-ray diffraction, and low- and high-resolution transmission electron microscope.