

Medical and environmental applications of magnetic nanomaterials

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Iron oxide-based magnetic nanoparticles can be easily produced and scale up using chemical co-precipitation reaction in alkaline media and further tailored to be suspended as a stable colloid named magnetic fluid. Magnetic fluids can be engineered to meet specific applications by themselves or else they can be used as an extremely flexible material platform to incorporate magnetic nanoparticles into different templates. The range of applications of both materials is quite broad, running for instance from the medical field, while used as drug delivery systems, up to energy and environmental applications in high performance electrical transformers and clean up technologies. This talk will be focused on the presentation of this material platform regarding its synthesis, incorporation in different templates and applications in both medical and technical fields. Direct application of magnetic fluids or nanocomposite materials for medical purposes requires material's biocompatibility, which is evaluated after performing *in vitro* and *in vivo* tests, using cell lines and animal models, respectively. Likewise, materials developed for environmental and industrial applications require the accomplishment of green technology standards. In both applications iron oxide magnetic nanoparticles, in particular nanosized maghemite, represent one of the best choices nowadays.