# Colloidal suspensions of Goethite (α-FeOOH) nanorods: effect of synthesis parameters on nanorods morphology and optical properties under magnetic field

Filippo Agresti[1*], Valentina Zin[1], Elisa Sani[2], Simona Barison[1], Marco Meucci[2], Luca Mercatelli[2], Stefano Rossi[3], Sergio Bobbo[3], Monica Fabrizio[1]

[1]*Institute of Condensed Matter Chemistry and Energy Technologies (ICMATE), National Research Council of Italy (CNR), Padova, Italy*
[2]*National Institute of Optics (INO), National Research Council of Italy (CNR), Firenze, Italy*
[3]*Institute of Construction Technologies (ITC), National Research Council of Italy (CNR), Padova, Italy*

**filippo.agresti@cnr.it*

Goethite (α-FeOOH) nanorods have been synthetized using two different methods, by the aging at different temperatures of ferrihydrite suspensions obtained through co-precipitation, or by fast conversion of ferrihydrite through ultrasonic irradiation. The synthesis method and parameters influence the aspect ratio and shape of nanoparticles. Colloidal suspensions of nanorods have been prepared by purification of the precipitates and subsequent dispersion in deionised water by sonication.
The synthetized nanopowders have been characterized by Powder X-ray Diffraction and Scanning Electron microscopy and the colloidal suspensions by Dynamic Light Scattering and ζ-potential measurements. Moreover, since goethite in colloidal suspension is a mineral liquid crystal [1, 2] and due to its peculiar magnetic properties [3, 4], transmittance of colloids in the UV-Vis-NIR range has been determined under different magnetic field directions and intensities. It has been found that the transmittance difference between 0° and 90° radiation polarization with respect magnetic field direction increases in NIR range. The effect is bigger when the aspect ratio of nanorods increases.

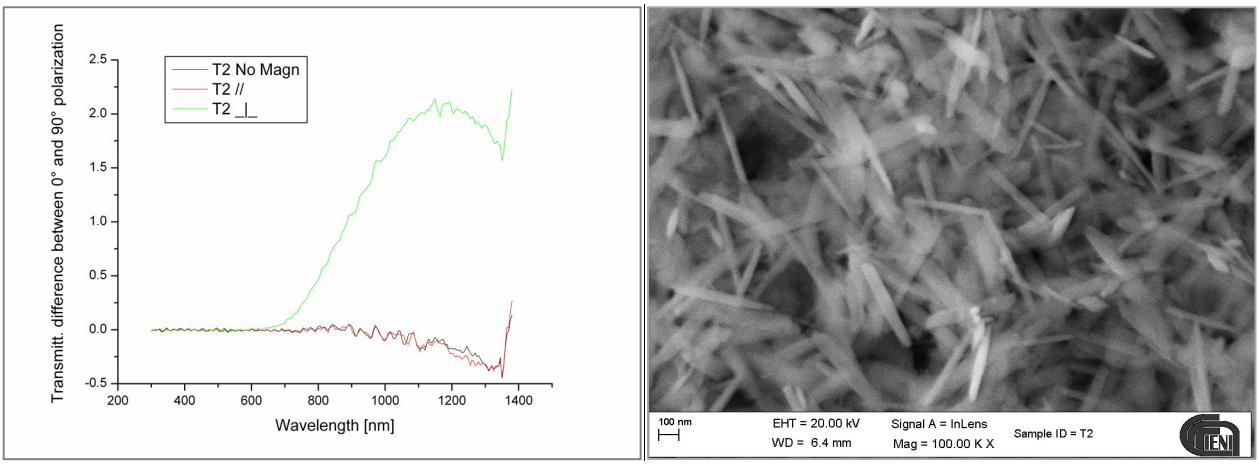


**Figure 1** Transmittance difference between orthogonal light polarizations (left), and FE-SEM micrograph of goethite nanorods (right).

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