

Article Abstract

Title:	Characterization of γ - and α -Fe ₂ O ₃ nano powders synthesized by emulsion precipitation-calcination route and rheological behaviour of α -Fe ₂ O ₃
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Abstract:	Nano crystals of γ -Fe ₂ O ₃ (maghemite) were synthesized by emulsion precipitation method using kerosene as oil phase, SPAN-80 (sorbitane monooleate) as the surfactant and sodium hydroxide as the precipitating agent. The characterization of the samples by FTIR (Fourier transform infra-red) and XRD (X-ray diffraction) techniques confirmed the formation of γ -Fe ₂ O ₃ (maghemite). Analysis by SEM (scanning electron microscope) and TEM (transmission electron microscope) was carried out to study the morphology and particle size. The as prepared samples contained inverse spinel cubic phase maghemite. Effect of initial iron concentration on crystallite size of maghemite showed that it decreased with the decrease in initial iron concentration. Transformation of γ -Fe ₂ O ₃ to α -Fe ₂ O ₃ (hematite) was studied by calcining the precursor in the temperature range of 500 to 850°C. Formation/transformation of phases at different temperatures was confirmed by FTIR and XRD studies. Images, obtained by SEM and TEM showed the morphology and nanocrystal formation of hematite. Room temperature rheological behaviour of the synthesized α -Fe ₂ O ₃ nano powder has been studied.
Keywords:	Iron oxide, emulsion, nanocrystals, crystal growth, rheological property