ELECTRONIC SUPPORTING MATERIAL

Synthesis, phase composition, Mössbauer and magnetic characterizations of iron oxide nanoparticles

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Selected Area Electron diffraction (SAED) patterns:

Figure S1. Selected area electron diffraction patterns (SAED) for the iron oxide nanoparticles prepared in (a) Argon atmosphere, and (b) Vacuum condition.

Fourier transform infrared spectroscopy (FTIR):

FTIR has been further used to characterize the iron oxide nanoparticles and the corresponding spectra for the sample prepared in argon and vacuum are shown in the range 400-1600 cm⁻¹ in shown Figure S2. The band in the frequency range 400-800 cm⁻¹ corresponds to vibrational modes of Fe-O bonds [1, 2]. The presence of maghemite was supported by the bands appearing at 570, 630, 630-700 cm⁻¹ and band at ~ 570 cm⁻¹ also shows the existence of magnetite, which is more intense in case of iron oxide prepared in case of vacuum [3-5]. Little shift of Fe–O bands from that of the standard maghemite has occurred either due to the overlapping of two bands (to give a band with average wave number) or due to the particles being nanosized. These observations imply formation of magnetite as the dominant phase
both samples in agreement with XRD, XANES and Mössbauer spectroscopy. The region from 1000 cm$^{-1}$ to 1450 cm$^{-1}$ corresponds to the vibrations of the surfactant molecules [1].

Figure S2. Fourier transform infrared (FTIR) spectra for iron oxide nanoparticles prepared in Argon atmosphere, and Vacuum condition.

References: