# ELECTRONIC SUPPORTING MATERIAL

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

Sarveena, [a], J. M. Vargas,[b] D. K. Shukla,[c] C. T. Meneses,[d] M. Singh,[a] P. Mendoza Zélis,[e] and S. K. Sharma[f, a*]

[a.] *Department of Physics, H. P. University, Shimla 171005 HP India*
[b.] *Centro Atomico Bariloche (CNEA), Instituto Balseiro (U. N. Cuyo) and Conicet, 8400 San Carlos de Bariloche, Río Negro, Argentina*
[c.] *UGC DAE Consortium for Scientific Research, Indore 452001, India*
[d.] *Núcleo de Pós-Graduação em Física, Campus Prof. José Aluísio de Campos, UFS, 49100-000 São Cristóvão, SE, Brazil*
[e.] *Instituto de Física de La Plata (IFLP- CONICET), Universidade Nacional de La Plata (UNLP), c.c. 67, 1900 La Plata, Argentina*
[f.] *Universidade Federal do Maranhão, Departamento de Física, 65080-805, São Luis, MA, Brazil, E. mail: surender76@gmail.com*

### Selected Area Electron diffraction (SAED) patterns:

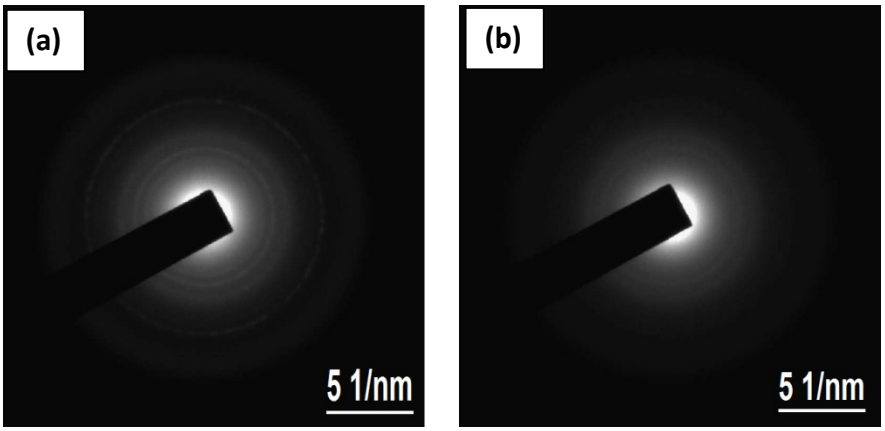


Figure S1. Selected area electron diffraction patterns (SAED) for the iron oxide nanoparticles prepared in (a) Argon atmosphere, and (b) Vacuum condition.

### 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].

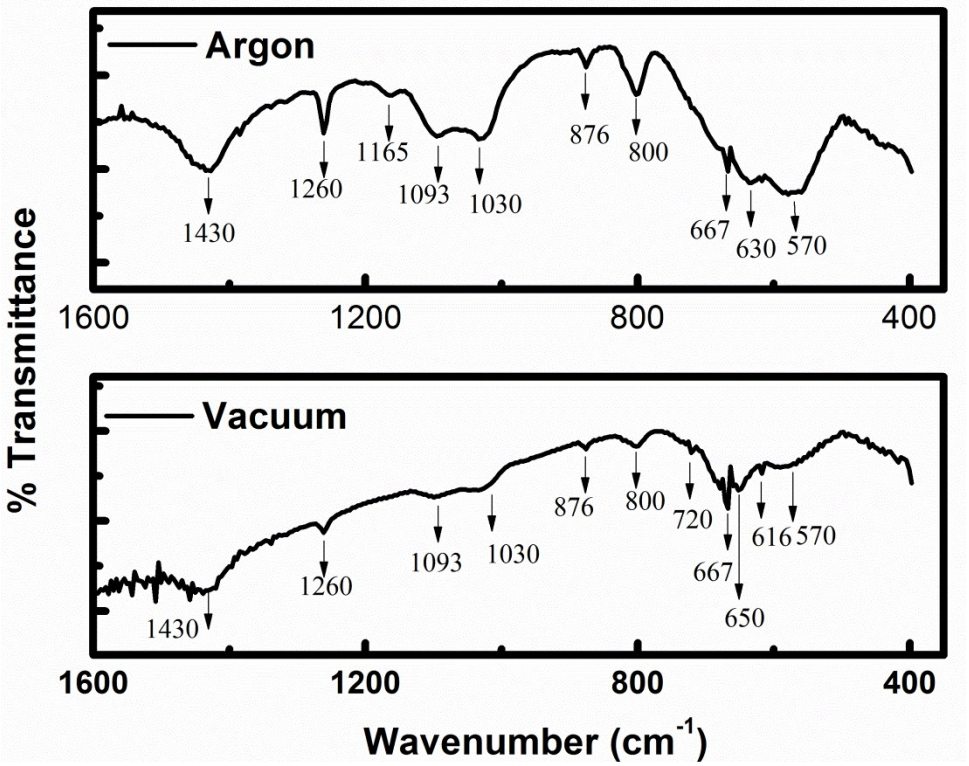


Figure S2. Fourier transform infrared (FTIR) spectra for iron oxide nanoparticles prepared in Argon atmosphere, and Vacuum condition.

**References:**


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