

Electronic Supplementary Information

Laser induced fano scattering, electron- phonon coupling, bond length and phonon life time of $\alpha\text{-Fe}_2\text{O}_3$ nanostructure

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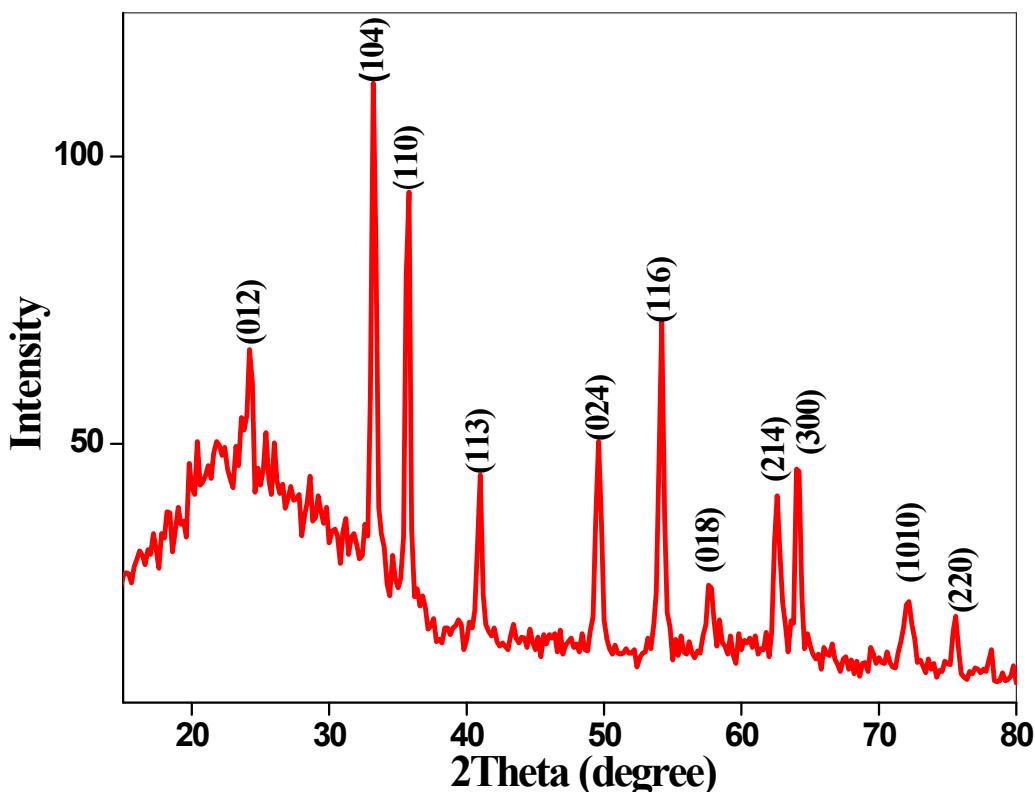


Fig. S1 The XRD pattern of as prepared $\alpha\text{-Fe}_2\text{O}_3$ nanostructure.

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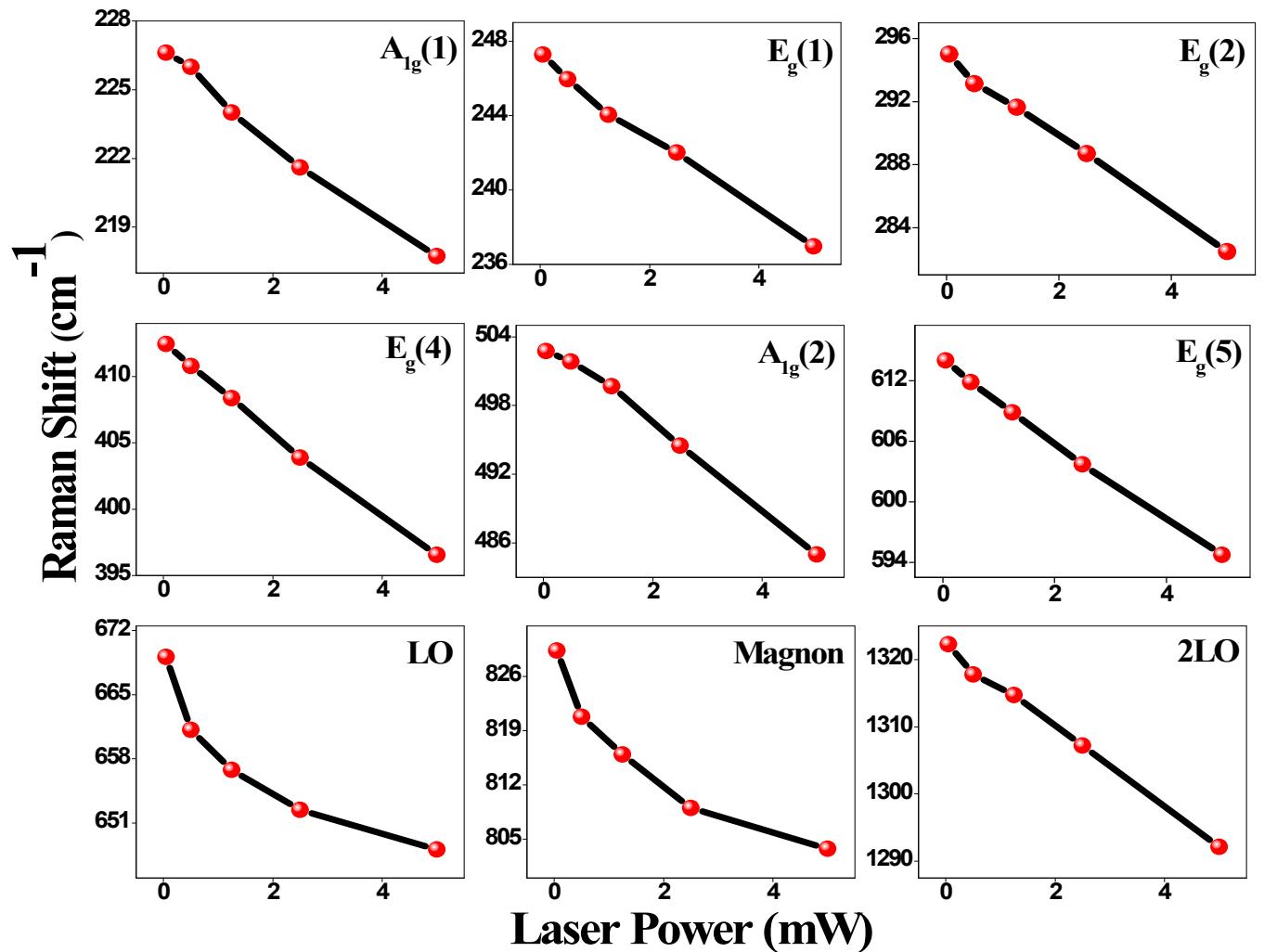


Fig. S2 The Raman shift observed for major intense Raman modes of of $\alpha\text{-Fe}_2\text{O}_3$ nanostructure with laser power.

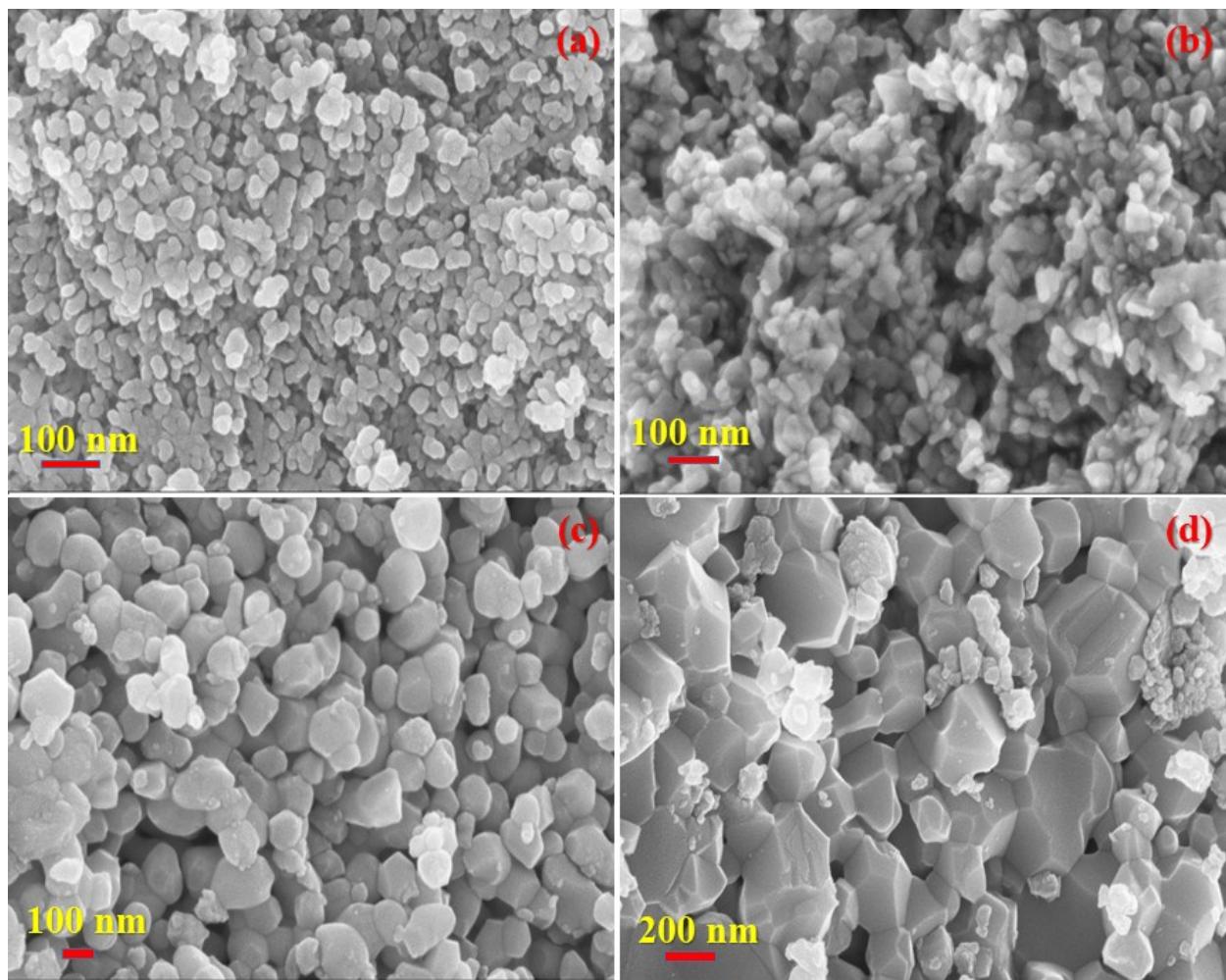
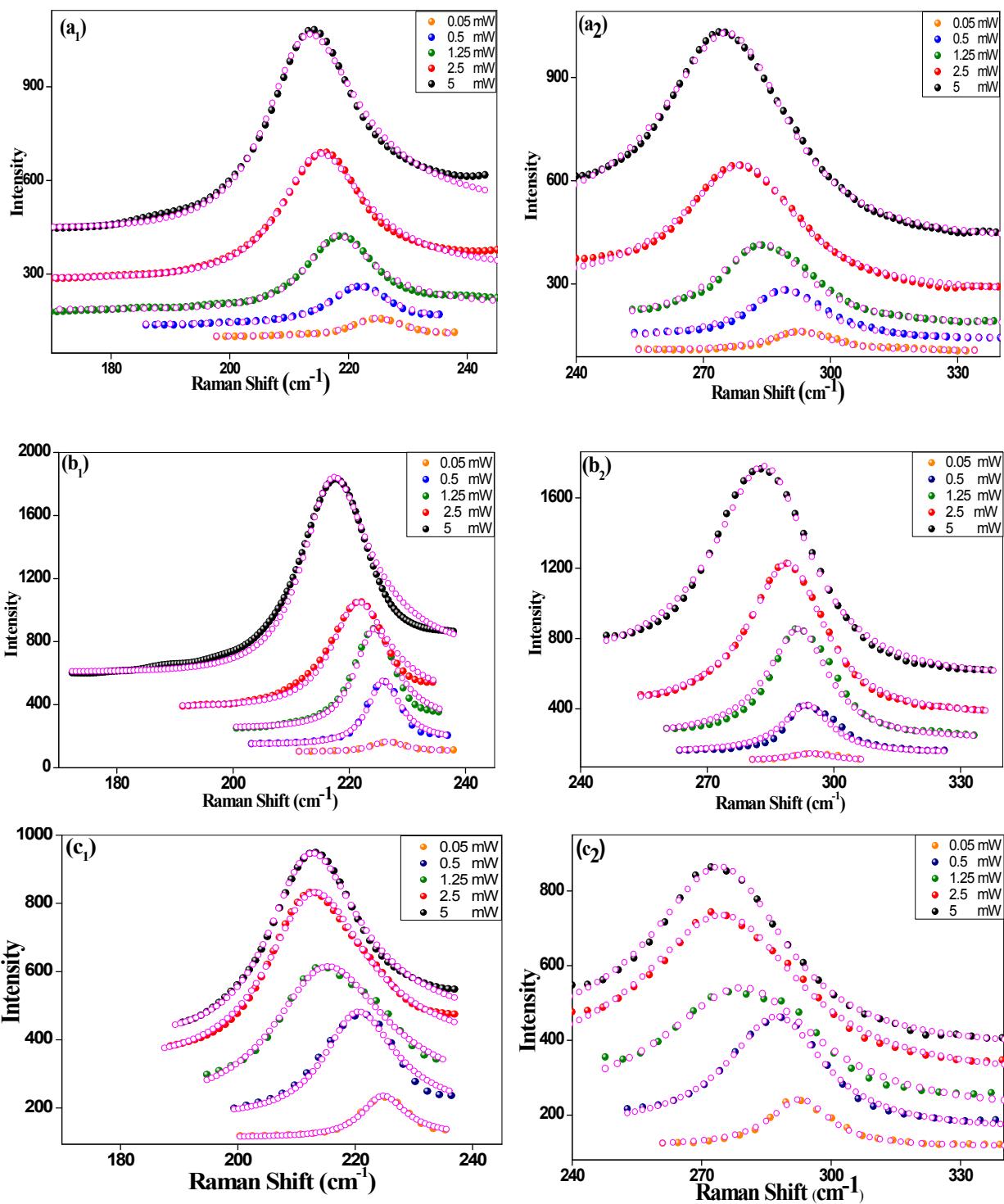


Fig S3. FE-SEM images of prepared α -Fe₂O₃ nanostructure annealed at (a) 300 °C (b) 500 °C (c) 700 °C (d) 900 °C. The images shows that the particle size of the prepared samples were varied from 20 to 400 nm with annealing temperature.



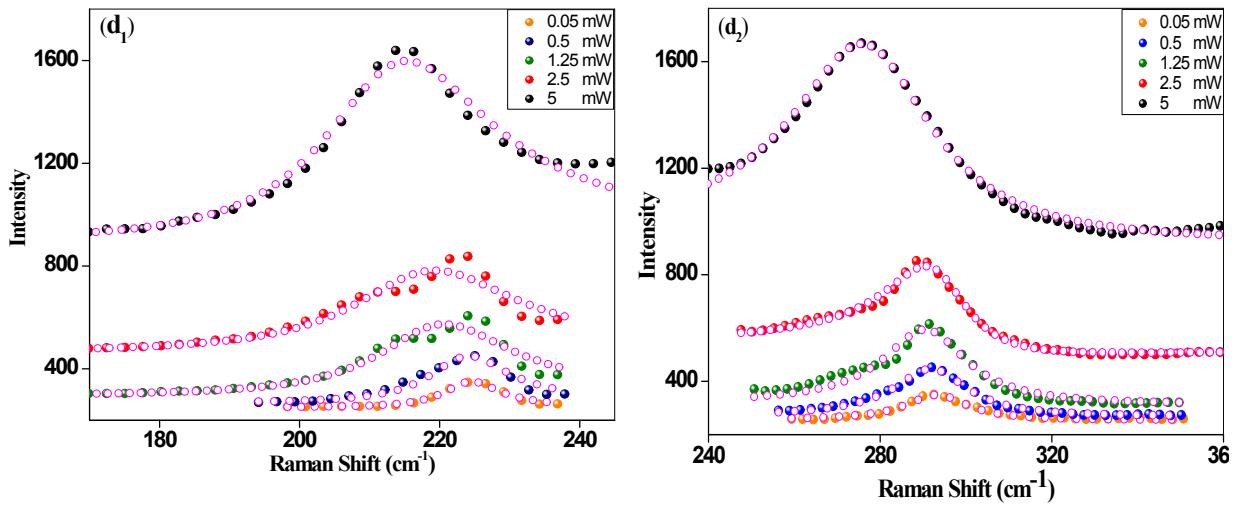


Fig. S4. The laser power dependent Raman spectra obtained for A_{1g}(1) (a₁, b₁, c₁, d₁) and E_g(4) (a₂, b₂, c₂, d₂) phonon modes of the annealed samples at 300, 500, 700 and 900 °C respectively. Solid line represent the Raman spectra obtained and dashed line represented the corresponding Fano fit.

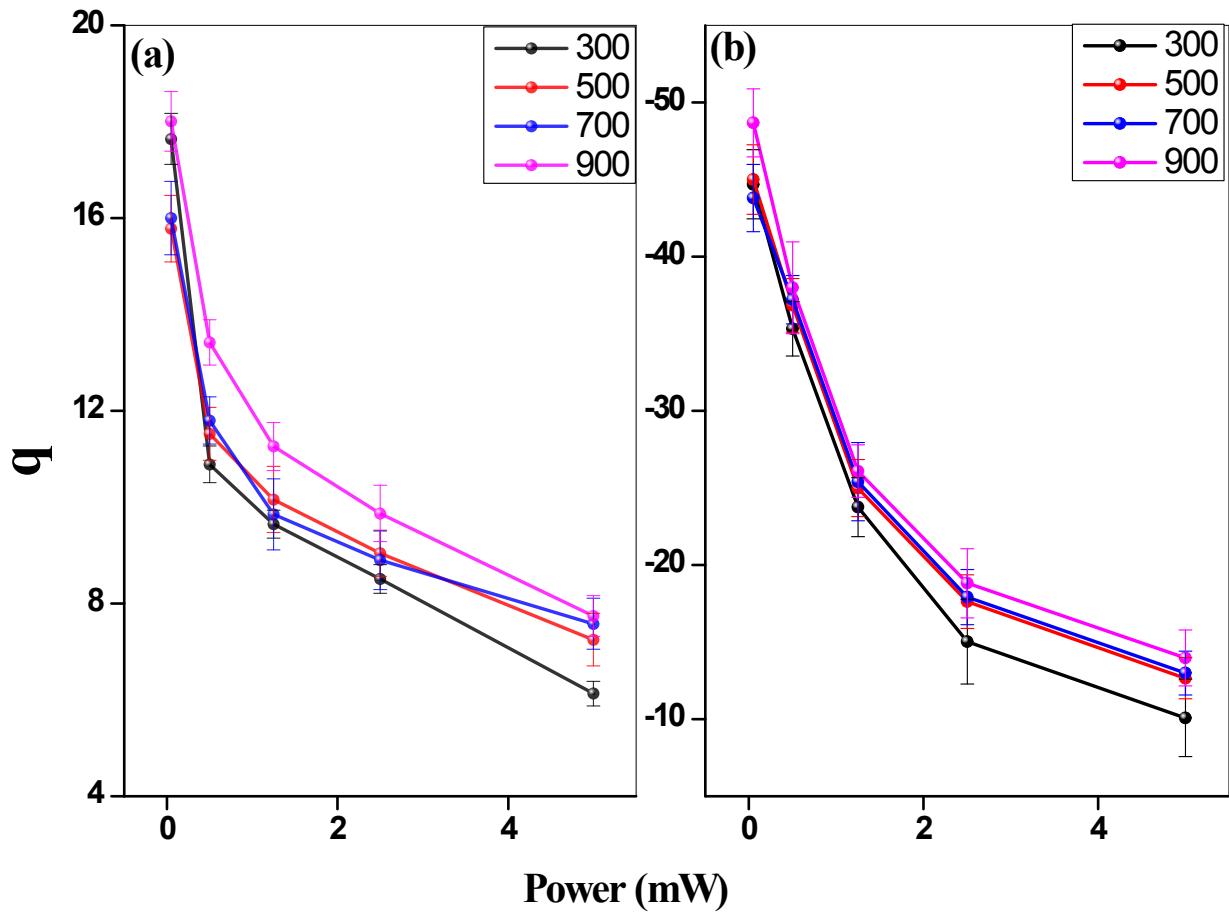


Fig S5. The variation of asymmetric parameters (q) of (a) $A_{1g}(1)$ and (b) $E_g(4)$ phonon modes with laser power for the samples annealed at 300, 500, 700 and 900 °C