Supporting Information

Understanding the Magnetic Memory Effect in Fe-Doped NiO Nanoparticles for the Development of Spintronic Devices

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Figure S1 (a)-(c) SEM images of 1, 5, and 10 % samples taken at the same magnification. (d) Histogram of mean diameter distribution of NiO and 1, 5, and 10 % samples obtained from SEM images (bottom to top). (d)-(g)The mean diameter <*d*> of the NPs was estimated by fitting the log-normal distribution function: $f(d) = \frac{1}{\sqrt{2\pi}d\sigma}\exp\left[-\frac{(\ln d - \ln\langle d\rangle)}{2\sigma^2}\right]$ to the histogram obtained from the SEM images. The solid red lines in (d)-(g) represent the log-normal distribution fit. The width of hexagonal NPs observed from SEM images is around ~ 10 to 30 nm**.**

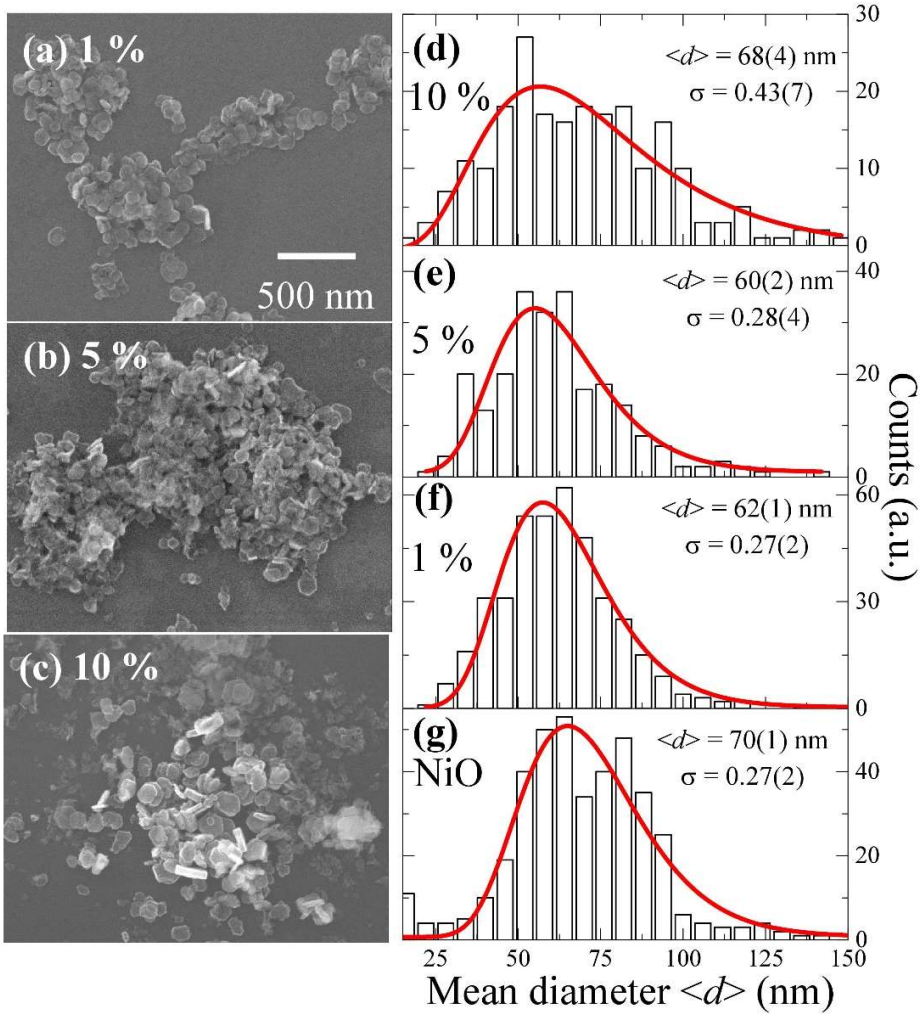

Figure S2 (a)-(c) TEM images, (d)-(f) HRTEM images and (g)-(i) SAED patterns of NiO, 5 and 10 % samples, respectively. The right-hand side of (g)-(i) shows the simulated SAED ring pattern.

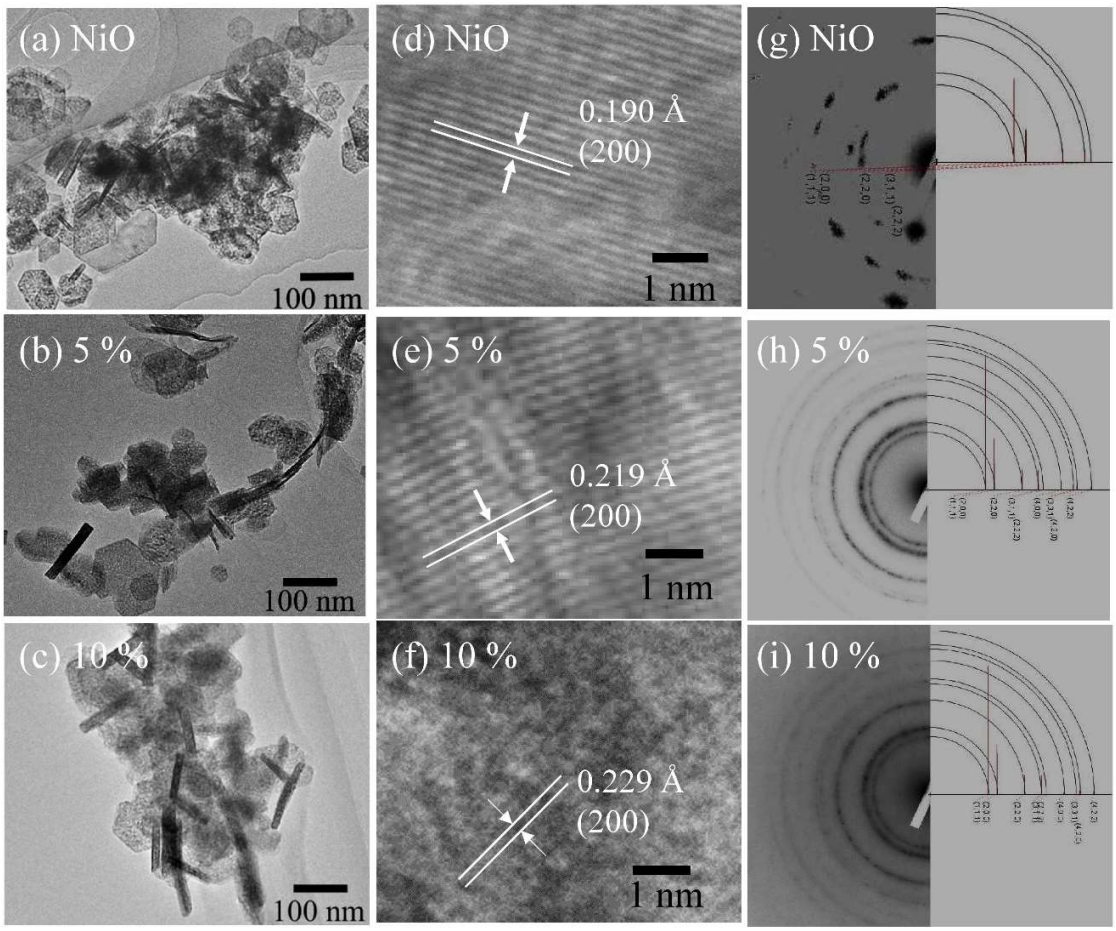

Figure S3 Intensity Resolution Function (IRF) displays the scattering angle dependence of FWHM for various Fe-doped concentration in NiO nanoparticles.

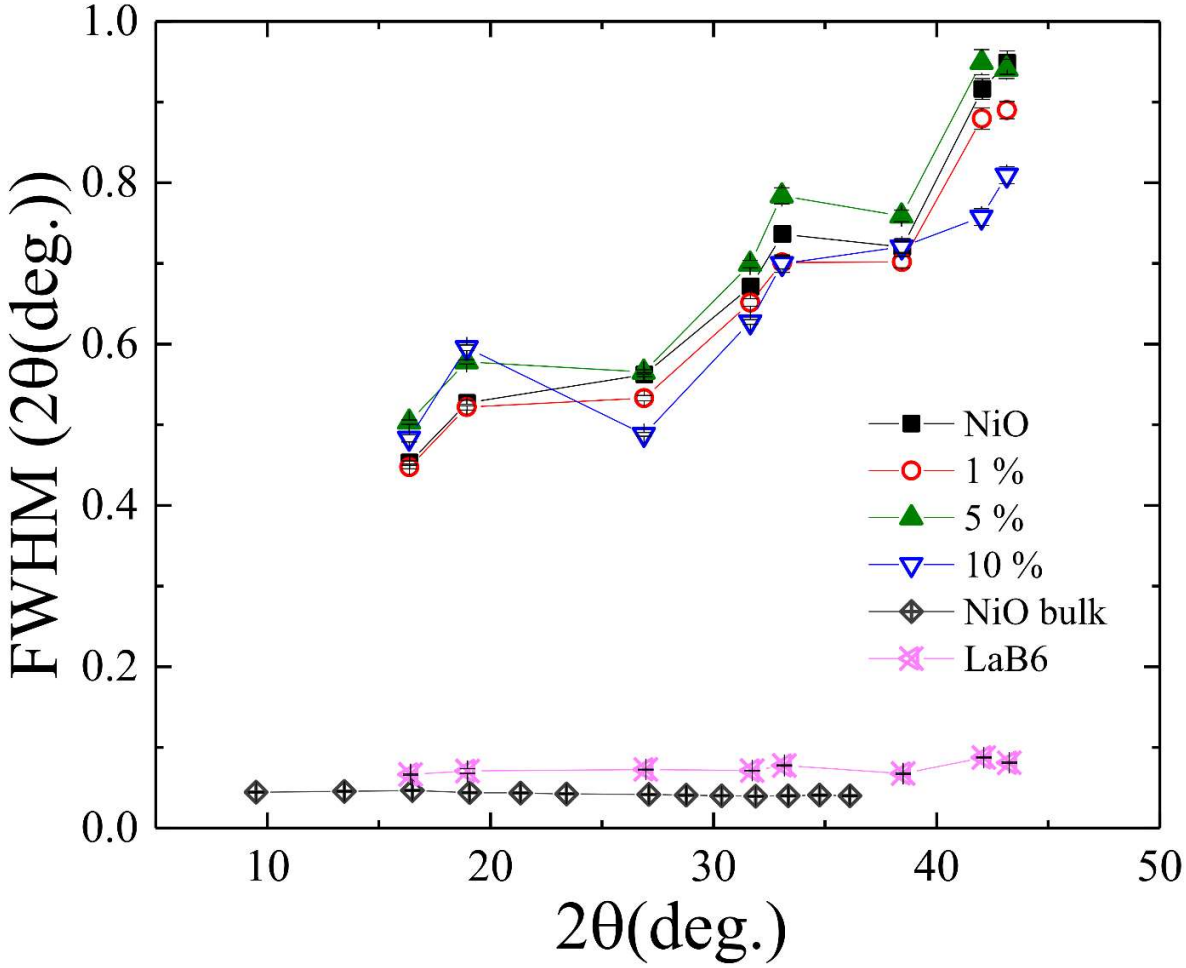

Figure S4 (a)-(b) Frequency dependence of AC susceptibility χ'(T) measurements from 5 and 10 % samples. (c) T_v vs. ln(v) for 5 and 10 % samples described with a slop of 2.74 and 2.79, respectively. The peak position shifts towards higher temperatures and the height of the peak decrease with increasing v, consistent with a glassy transition with freezing temperature T_v.

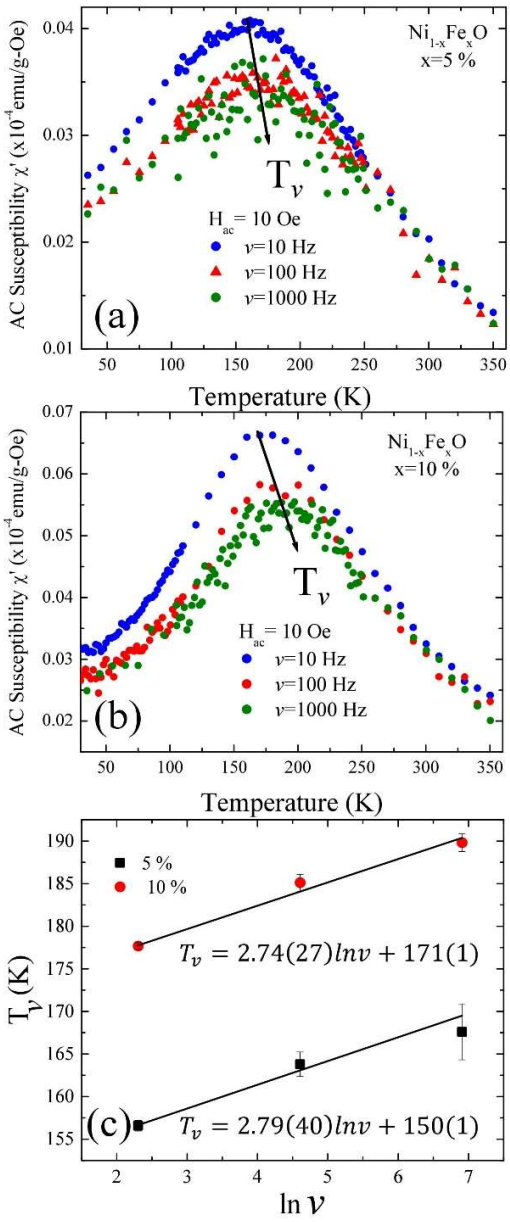

Figure S5 (a)-(d) ZFC M(H_a) loops measured at a different temperature from 0, 1, 5 and 10 % samples. (e) Temperature dependency of obtained values of H_C.

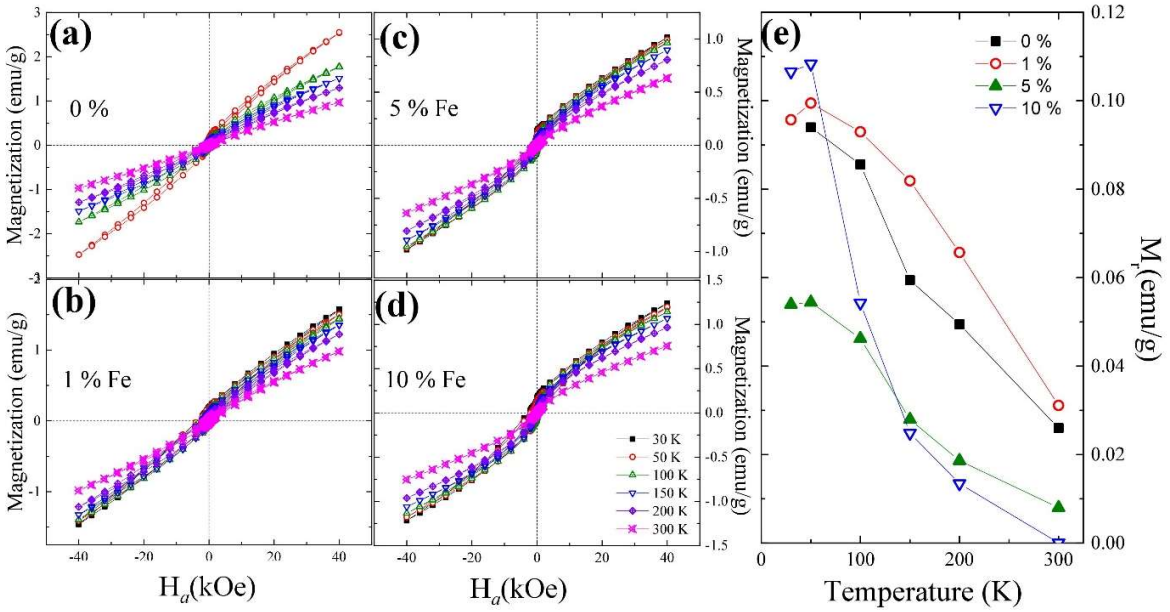

Figure S6 (a)-(d) FC M(H_a) loops measured with different cooling field H_a from 0, 1, 5 and 10 % samples, where inset of the respective figure shows the magnified FC M(H_a) loops in low-field region. (e) FC cooling field H_a dependency of M_r.