

Synthesis conducted in the presence of OA without HA

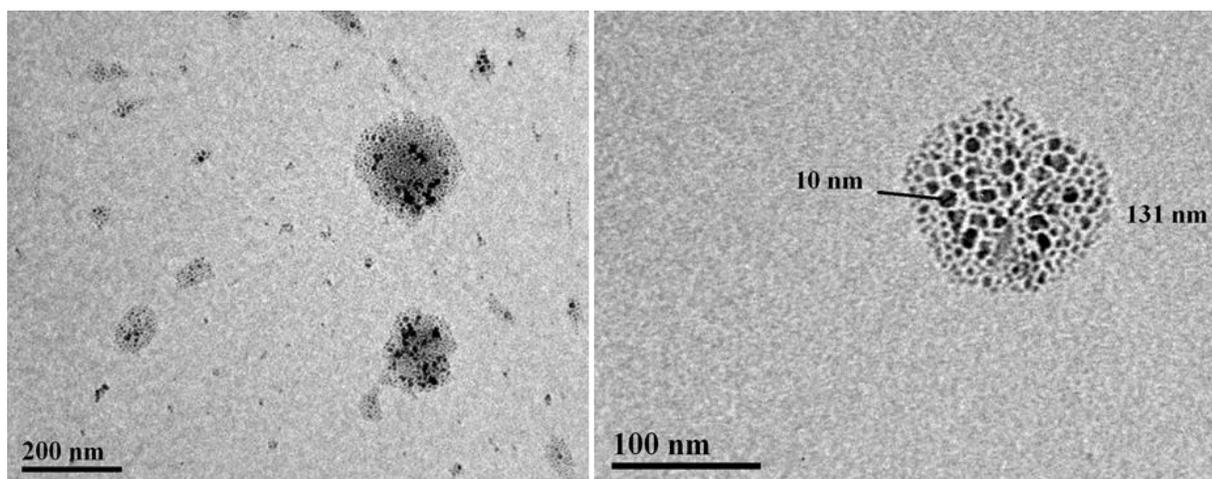


Figure S1. TEM images of Fe₃O₄ NPs prepared in the presence of OA, without the addition of HA.

Table S1. DLS of different fatty acid-stabilized NPs*

Sample	Diameter (nm)
Lauric acid-stabilized NPs	155 ± 7.18
Palmitic acid-stabilized NPs	119 ± 3.98
Stearic acid-stabilized NPs	125 ± 5.45

*Synthesis was conducted without the addition of HA

Preparation of various doped ferrite metal oxides

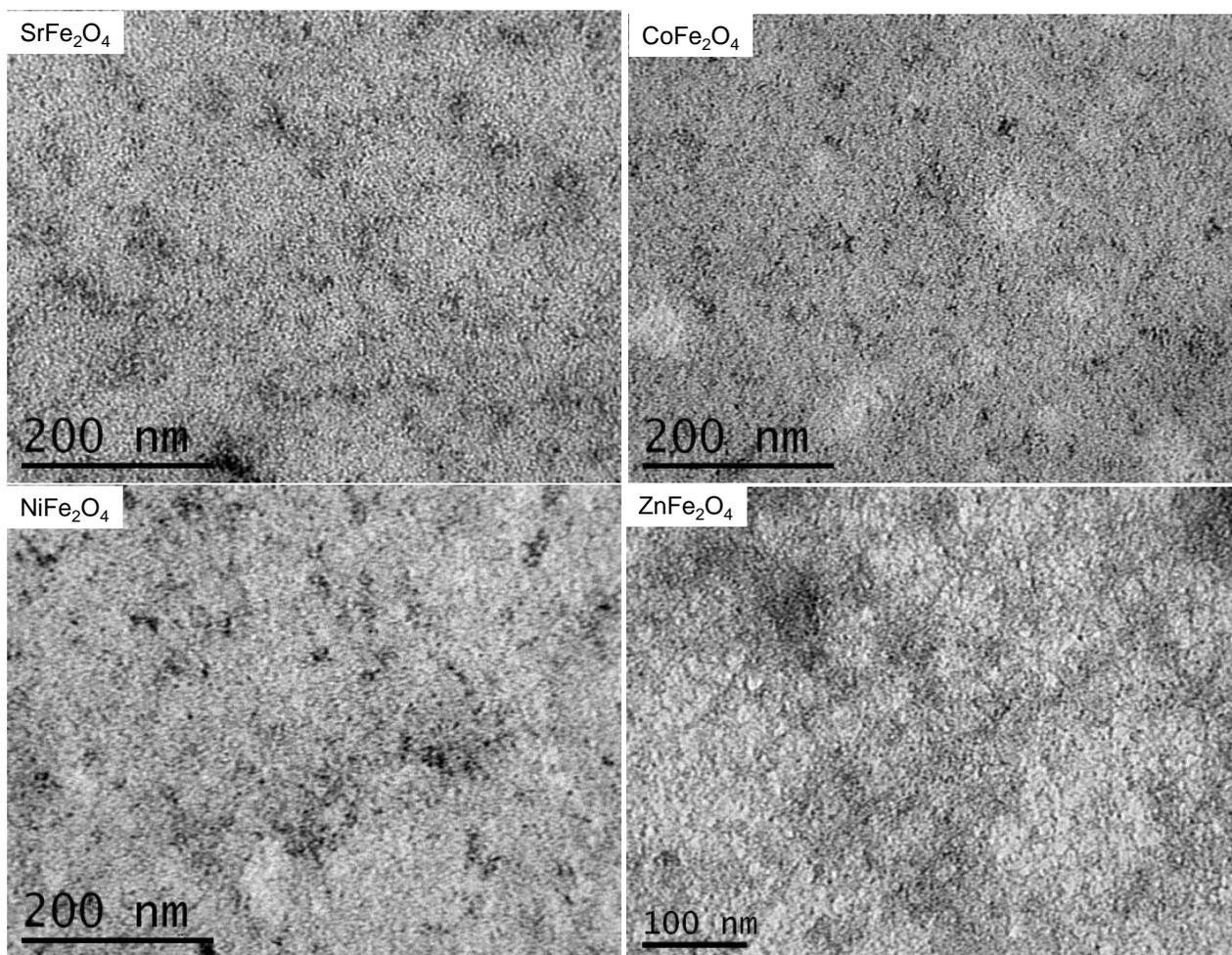
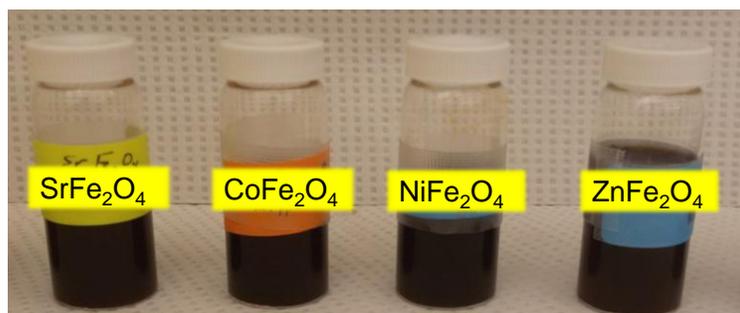


Figure S2. TEM images along with photographs showing the successful preparation of ~ 2 nm OA-stabilized colloidal doped ferrite metal oxides MFe_2O_4 ($\text{M} = \text{Sr}, \text{Co}, \text{Ni}, \text{and Zn}$) dispersed in hexane. Experimentally, same procedure was followed using the corresponding metal (II) chloride salts instead of the Fe(II) precursor. The as-synthesized particles were stable for months without evident precipitation. This confirms the simplicity and generality of our approach.

Characterization of PVP-stabilized Fe₃O₄ NPs

Dynamic Light Scattering (DLS)

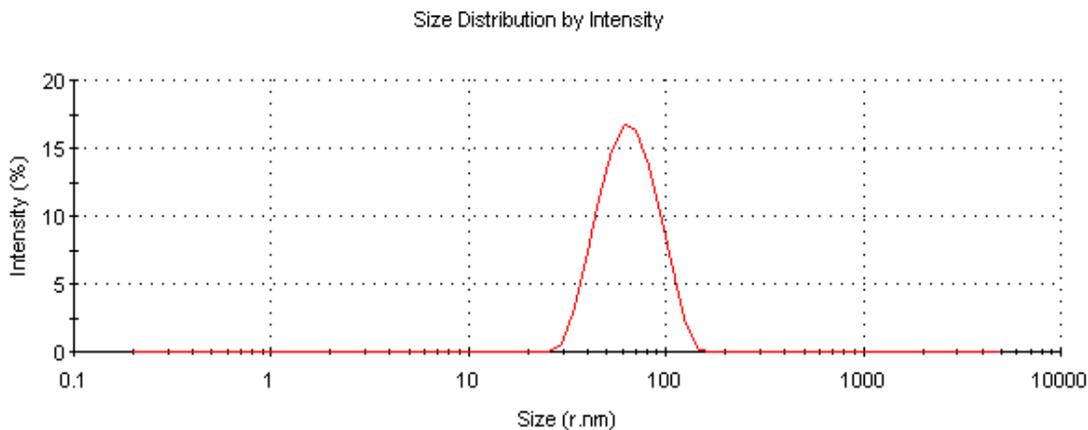


Figure S3. Representative DLS for PVP-stabilized Fe₃O₄ M³NPs (56 ± 5.05 nm). Three independent measurements were conducted.

Fourier Transform Infrared Spectroscopy (FTIR)

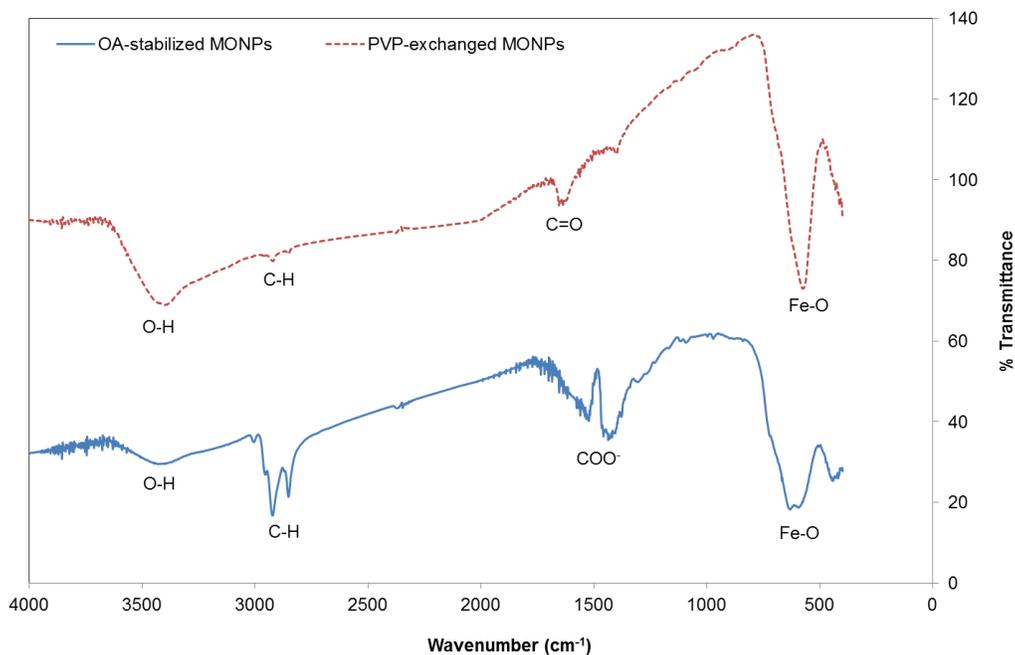


Figure S4. FTIR spectra for OA-stabilized Fe₃O₄ M³NPs (blue), and PVP-stabilized Fe₃O₄ M³NPs after the ligand exchange (red). The spectra clearly shows that the intensity of the characteristic vibrational modes ascribed to OA molecules dramatically decreased after PVPylation, with a shift in the vibrational band from 1517 to 1660 cm⁻¹ belonging to C=O group of PVP.

Thermogravimetric Analysis (TGA)

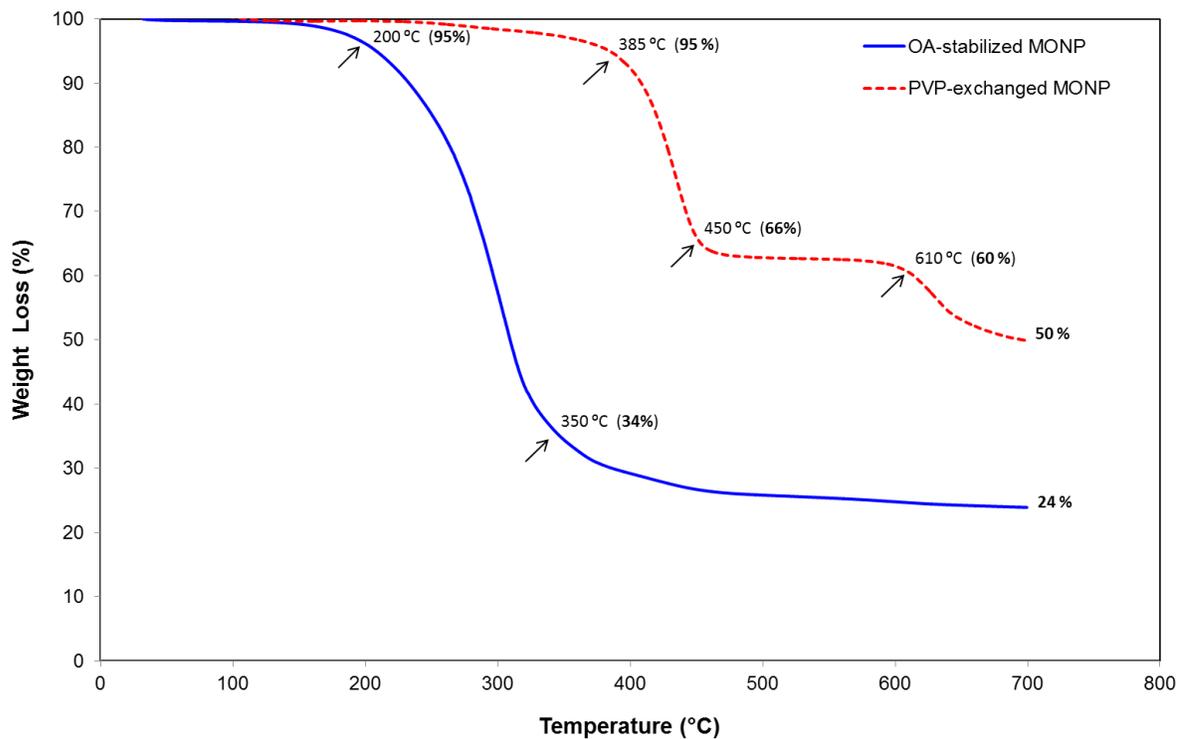


Figure S5. TGA curves for OA-stabilized Fe_3O_4 M^3NPs (blue), and PVP-stabilized Fe_3O_4 M^3NPs after the ligand exchange (red).