Supplemental information

Influences of spinel type and polymeric surfactants on the size evolution of colloidal magnetic nanocrystals (MFe_2O_4, M = Fe, Mn)

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Table S1 Results and analysis based on TGA curves for manganese ferrite nanoparticles

Sample condition	Second weight loss /%	Third weight loss /%	Total mass loss + uncoordinated surfactants + adsorbed water /%
12 h, 160 °C, PVP	32	6	50
12 h, 180 °C, PVP	6.5	2	11
72 h, 180 °C, PVP	7.5	1.5	12
12 h, 160 °C, PEG_{300}	12	1.7	16
12 h, 180 °C, PEG_{300}	8.5	1.5	12

Table S2 Results and analysis based on TGA curves for magnetite nanoparticles

Sample condition	Second weight loss /%	Third weight loss /%	Total mass loss + uncoordinated surfactants + adsorbed water /%
12 h, 160 °C, PVP	9	1.5	12.5
12 h, 180 °C, PVP	5	2	8
2 h, 180 °C, PVP	3	2	5.5
12 h, 160 °C, PEG_{300}	10	1.3	13
12 h, 180 °C, PEG_{300}	6	1.2	8

Table S3 Infrared transmission frequencies of pure surfactants and final product, manganese ferrite nanoparticles (12 h, 160 °C)

Observed bands /cm^{-1}			Observed bands /cm^{-1}		
PEG_{300}	Product	Band assignment	PVP	Product	Band assignment
3380	3360	ν_{O-H} and adsorbed water	3430-3530	3320-3430	adsorbed water
2890	2870, 2930	$(\nu_S, \nu_{as})_{CH2}$	2890, 2960	2870,2950	$(\nu_S, \nu_{as})_{CH2}$
	1570	δ_{H2O}		1570	δ_{H2O}
1470, 1360	1430	CH_2 bending	1670	1570-1670^{sh}	$\nu_{C=O}$
1100	1080	ν_{C-O}	1430	1430	CH_2 bending
940	895	ρ_{CH2} out of plane bending	1280	1220	ν_{C-N}
	540	ν_{M-O}		1050-1080	ν_{C-O}
				879	CH_2 out of plane bending
				550	ν_{M-O}

sh = shoulder, ν_{as} = asymmetric stretching, ν_S = symmetric stretching, δ = scissoring, ρ = rocking

Table S4 Infrared transmission frequencies of surfactant and final product, magnetite nanoparticles (12 h, 160 °C)

Observed bands /cm^{-1}			Observed bands /cm^{-1}		
PEG_{300}	Product	Band assignment	PVP	Product	Band assignment
3380	3360	ν_{O-H} and adsorbed water	3430-3530		adsorbed water
2890	2870, 2920	$(\nu_S, \nu_{as})_{CH2}$	2890, 2960		$(\nu_S, \nu_{as})_{CH2}$
	1590	δ_{H2O}		1590	δ_{H2O}
1470, 1360	1430	CH_2 bending	1670	1590-1650^{sh}	C=O stretch
1100	1050-1080	$\nu_{C–O}$	1430	1430	CH_2 bending
940	895	ρ_{CH2} out of plane bending	1280		$\nu_{C–N}$
	555	$\nu_{M–O}$		1050-1100	$\nu_{C–O}$
				895	CH_2 out of plane bending
				555	M–O stretching

sh = shoulder, ν_{as} = asymmetric stretching, ν_S = symmetric stretching, δ = scissoring, ρ = rocking

Table S5 Magnetization saturation for magnetic ferrite nanoparticles

Sample	Ms /(emu·g-particle^{-1}), T = 300 K
$MnFe_2O_4$ (12 h, 200 °C)	70
$MnFe_2O_4$ (12 h, 180 °C)	62
Fe_3O_4 (12 h, 180 °C)	81.81
$MnFe_2O_4$ (12 h, 200 °C) [21]	53.2
Fe_3O_4 (12 h, 200 °C) [21]	81.9

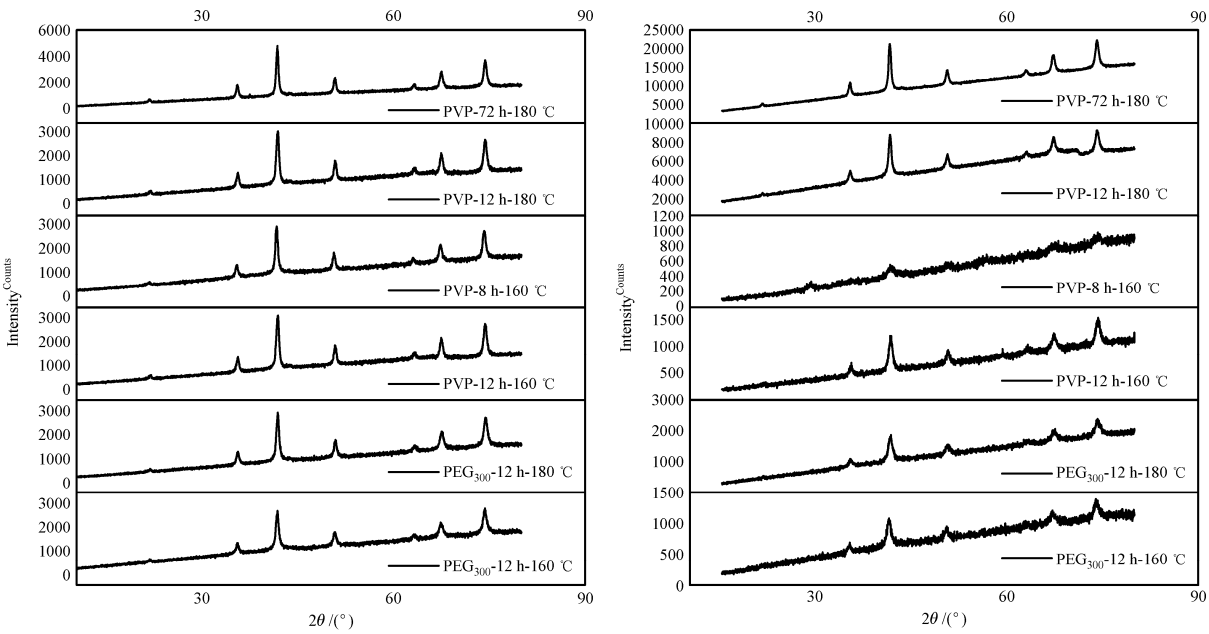

Fig. S1 XRD patterns of (a) Fe_3O_4, and (b) $MnFe_2O_4$ nanoparticles

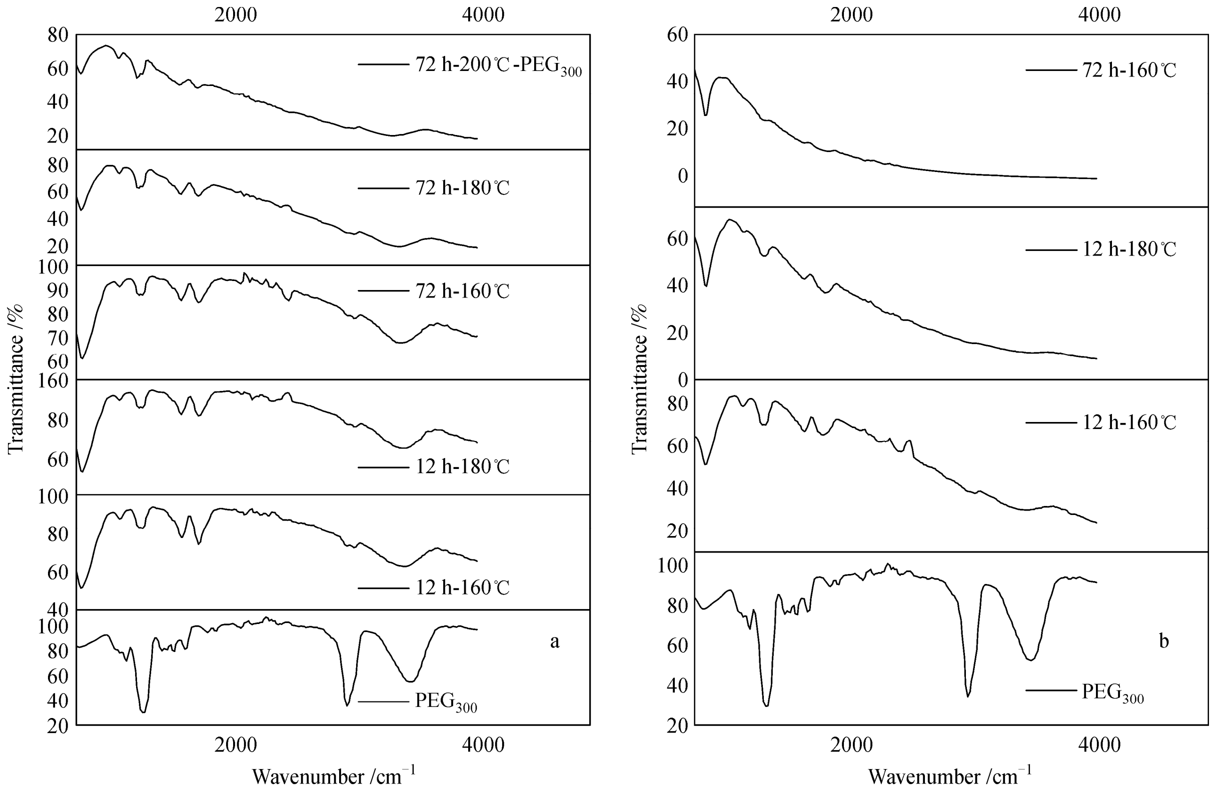

Fig. S2 FTIR spectra of (a) $MnFe_2O_4$, and (b) Fe_3O_4 nanoparticles coated with PEG_{300}

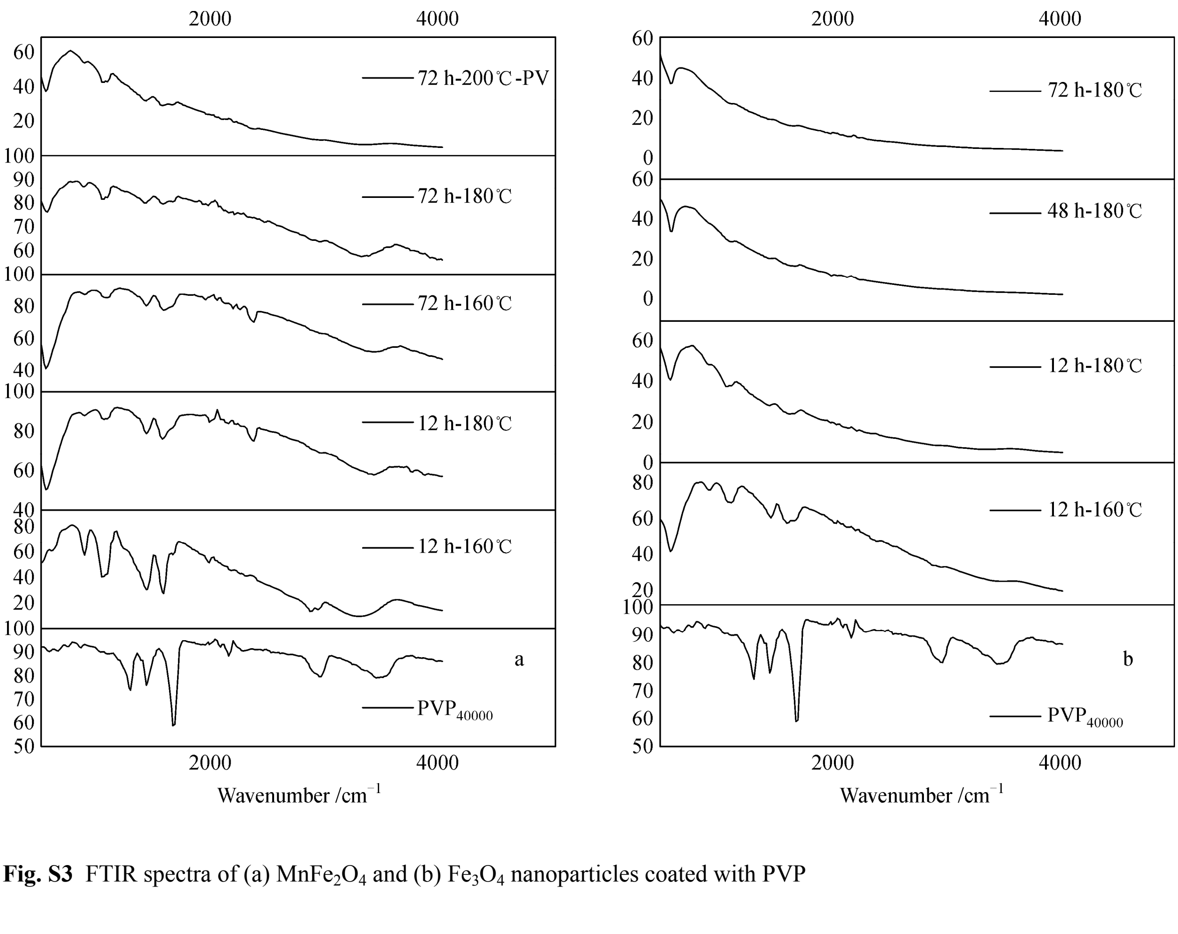

Fig. S3 FTIR spectra of (a) $MnFe_2O_4$ and (b) Fe_3O_4 nanoparticles coated with PVP