Supporting Information

Ultrasmall water-soluble metal-iron oxide nanoparticles as T_1 -weighted contrast agents of magnetic resonance imaging Leyong Zeng^a, Wenzhi Ren^a, Jianjun Zheng^{b,*}, Ping Cui^a, Aiguo Wu^{a,*}

The as-prepared MFe_2O_4 (M=Fe, Zn, Ni) nanoparticles were dialyzed in aqueous solutions for 5 times, and then were frozen out for powders using a freeze drier. Finally, they were redispersed in aqueous solutions, and the concentration of MFe_2O_4 (M=Fe, Zn, Ni) nanoparticles was about 5 mg/mL.

1. Dynamic Light Scattering (DLS) characterization of MFe_2O_4 (M=Fe, Zn, Ni) nanoparticles in water phase

DLS characterization showed that the average sizes of MFe₂O₄ (M=Fe, Zn, Ni) nanoparticles were about 45 nm, 50 nm, and 75 nm, respectively. Compared with the results of TEM, the increase of nanoparticle sizes could be attributed to the agglomeration of nanoparticles in the process of dialysis and dryness. It is also normal because the nanoparticles in aqueous solutions with a large hydration dynamic diameter compared with the dried nanoparticles in TEM.

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The Zeta potential results showed that the surface charges of nanoparticles were negative, and the Zeta potentials were -10.8, -6.96, and -4.93 mV for Fe₃O₄, ZnFe₂O₄, and NiFe₂O₄, respectively. The negative surface charges could be attributed to the citrate ions coated on the surface MFe₂O₄ (M=Fe, Zn, Ni) nanoparticles.

Size Distribution by Volume



Fig. S1 DLS of Fe₃O₄ nanoparticle colloids



Size Distribution by Volume

Fig. S2 DLS of ZnFe₂O₄ nanoparticle colloids

Size Distribution by Volume



Fig. S3 DLS of NiFe₂O₄ nanoparticle colloids

2. Zeta potential characterization of MFe₂O₄ (M=Fe, Zn, Ni) nanoparticle colliods in

water phase



Fig. S4 Zeta potential of Fe₃O₄ nanoparticle colliods.

			Mean (mV)	Area (%)	Width (mV)
Zeta Potential (mV):	-6.96	Peak 1:	-7.01	100.0	4.27
Zeta Deviation (mV):	4.20	Peak 2:	0.00	0.0	0.00
Conductivity (mS/cm):	1.06	Peak 3:	0.00	0.0	0.00
Result quality (Good				



Fig. S5 Zeta potential of ZnFe₂O₄ nanoparticle colliods.

				Mean (mV)	Area (%)	Width (mV)
Zeta Potential (mV): -4.63 Zeta Deviation (mV): 4.30 Conductivity (mS/cm): 1.32			Peak 1:	-4.75	100.0	4.63
			Peak 2: Peak 3:	0.00 0.00	0.0	0.00 0.00
					0.0	
F	Result quality <mark>G</mark>	bood				
		Ze	eta Potential I	Distribution		
	100000 _T					
Total Counts	80000					
	60000					
	40000					
	20000					
	-200	-100		0	100	200
			Zeta F	Potential (mV)		

Fig. S6 Zeta potential of NiFe₂O₄ nanoparticle colliods.