Supplementary Material

Influence of Experimental Parameters of a Continuous Flow Process on the Properties of Very Small Iron Oxide Nanoparticles (VSION) Designed for T_1-weighted Magnetic Resonance Imaging (MRI)

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Table S1. Relaxometric properties of Dotarem®, Resovist® and batch-prepared VSION

Sample	20 MHz			60 MHz		
	r_1 ($s^{-1}mM^{-1}$)	r_2 ($s^{-1}mM^{-1}$)	r_2/r_1	r_1 ($s^{-1}mM^{-1}$)	r_2 ($s^{-1}mM^{-1}$)	r_2/r_1
VSION	5.6	8.3	1.48	5.7	12.8	2.24
Dotarem®	3.7	4.4	1.19	3.1	3.6	1.16
Resovist®	24.9	176.8	7.10	10.9	190.2	17.45

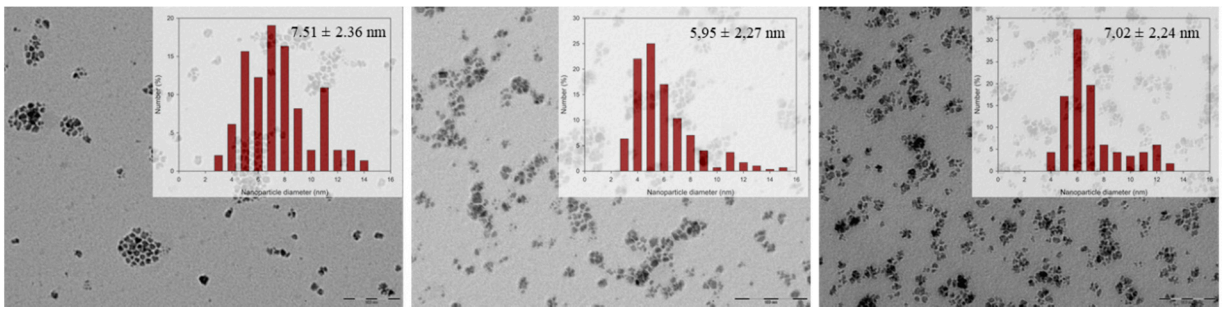

Figure S1. TEM images of the nanoparticles obtained through flow synthesis with various equivalents of oleic acid: 4 equivalents (left), 8 equivalents (middle) and 12 equivalents (right) in the 1 mm capillary

reactor. The scale bar corresponds to 100 nm. Insets show the size distributions determined by statistical analysis

Table S2. Size and relaxometric properties of VSION synthesized using various surfactant concentrations (oleic acid and oleylamine)

Oleic acid/Oleylamine/Fe(acac)$_3$	D_{PCS} (nm)	D_{TEM} (nm)	PDI	r_2/r_1 (20 MHz)	r_2/r_1 (60 MHz)
2/2/1	10.7	5,48 ± 1,26	1.26	1.76	3.03
4/4/1	7.7	3,73 ± 0,77	1.16	1.53	2.43
6/6/1	10.4	5,86 ± 1,38	1.23	1.67	3.1

Table S3. Size and magnetic properties of VSION synthesized using various oleylamine concentrations

Oleylamine/Fe(acac)$_3$	M_{SAT} (A·m²/kg)	M_{SAT}^{NMRD}(A·m²/kg)	D_{NMRD} (nm)
4/1	29.4	24.9	9.98
8/1	28.1	25.5	8.78
12/1	40.1	35.9	8.34

Table S4. size and relaxometric properties of VSION synthesized at different temperatures using continuous flow process

Temperature (°C)	D_{PCS} (nm)	M_{SAT} (A·m²/kg)	D_{NMRD} (nm)	D_{TEM} (nm)
200	6.5	11.7	7.2	3.54 ± 0.76
225	7.9	22	6.8	3.68 ± 0.60
250	7.7	33.9	6.2	3.73 ± 0.77
275	9.2	37.7	6	3.53 ± 0.54
300	8	41.7	6.3	3.74 ± 0.55

Table S5. size and magnetic properties of VSION synthesized using different BPR

BPR	D_{PCS} (nm)	M_{SAT} (A·m²/kg)	D_{NMRD} (nm)	D_{TEM} (nm)
5 psi	8.6	---	---	---
20 psi	6.7	---	---	---
40 psi	7.7	33.9	6.2	3.73 ± 0.77
75 psi	7.7	32.3	6.3	3.91 ± 0.49
100 psi	8.9	32.3	6.3	3.82 ± 0.46

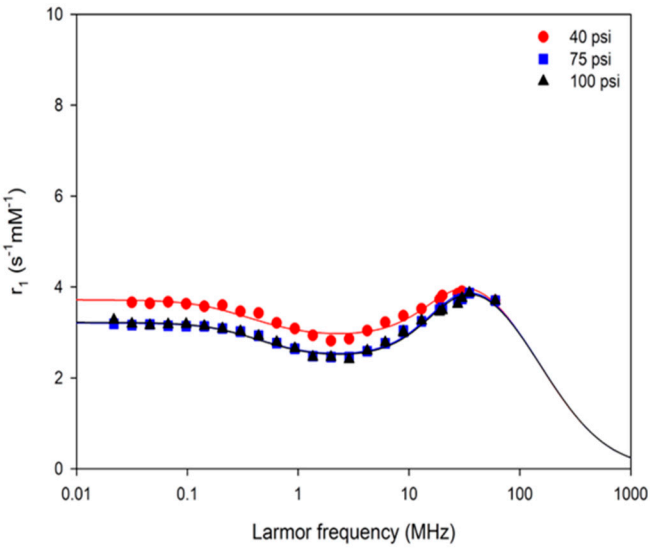

Figure S2. ^{1}H NMRD profiles of iron oxide nanoparticles obtained at various pressure recorded at 37 °C in THF.

Table S6. Magnetic properties extracted from the fitting of the magnetization curves of samples obtained in the 1 mm capillary reactor.

Flow rate (mL·min^{-1})	**Magnetometry data**	
	D (nm)	Ms (emu·g^{-1})
0.05	3.89 ± 0.94	45.2
0.1	3.94 ± 0.95	41.9
0.5	3.61 ± 0.72	34.5
1	3.46 ± 0.4	31.6