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REVIEW ARTICLE

3D (bio)printing of magnetic hydrogels: Formulation and applications in tissue engineering

Supplementary File

Table S1. Examples of commercially available magnetic nanoparticles

Manufacturer	Catalog #	Composition	Coating	Size (nm)	Zeta potential (mV)	Saturation magnetization	Ref.
Ocean Nanotech	SHA-5	γ-Fe_2O_3, Fe_3O_4	Monolayer of oleic acid and another of an amphiphilic polymer	10.46 ± 3.88 (HD)	-0.03 ± 0.005	≈ 44.69 emu/g	[1]
	SHA-10			18.07 ± 4.72 (HD)	5.03 ± 0.07	≈ 29.85 emu/g	
	SHA-15			20.69 ± 6.31 (HD)	7.66 ± 0.05	≈ 58.41 emu/g	
	SHA-20			27.56 ± 11.29 (HD)	-0.41 ± 0.33	≈ 54.66 emu/g	
	SHA-25			28.28 ± 10.38 (HD)	1.15 ± 0.49	≈ 38.70 emu/g	
	SHA-30			32.60 ± 12.17 (HD)	-0.69 ± 0.05	≈ 35.78 emu/g	
Chemicell	fluidMAG-Amine	Fe_3O_4	Aminosilane	114.2 ± 1.2 (HD)	54.6 ± 0.8	106.8 emu/g Fe	[2]
	fluidMAG-ARA		Glucuronic acid	10.98 (U)	n.a.	49 emu/g	[3,4]
	fluidMAG-UC/A		None	50, 100 and 200 (HD)	n.a.	n.a.	[5]
Micromod	Synomag®-D 104-00-501	Dextran iron oxide composite particles	None	50 (U)	n.a.	> 110 emu/g	[6]
	Synomag®-D 104-56-501		PEG-COOH	50 (U)	n.a.	n.a.	[7]
	Synomag®-D 104-26-501		Biotin	50 (U)	n.a.	n.a.	[8]
Sigma-Aldrich	700312	Fe_3O_4	None	10 ± 1 (CD)	n.a.	> 45 emu/g	[9]
	747408		PEG	28–32 (CD)	n.a.	n.a.	[10]
	747254	Fe_3O_4	COOH	9–11 (CD)	n.a.	n.a.	[11]
	773352	$CoFe_2O_4$	None	20–30 (CD)	n.a.	(56.0 ± 0.5) emu/g	[12]
US Research Nanomaterials	Iron Oxide Nanopowder/ Nanoparticles (Fe_3O_4, high purity, 99.5+%, 15–20 nm)	Fe_3O_4	None	15–20 (CD)	n.a.	n.a.	[13,14]
Shanghai JinSui	n.a.	Fe_3O_4	None	20–30 (U)	n.a.	n.a.	[15]
BASF SE	n.a.	CFeO	None	1260 (U)	n.a.	n.a.	[16]
Nanjing Emperor Nano Material Co., Ltd.	n.a.	Fe_3O_4	None	10–20 (U)	n.a.	≈ 30 emu/g	[17]
NanoMyp	n.a.	Fe_3O_4	MMA, HEM, and EDGM	110 (HD)	n.a.	n.a.	[18]
Macklin Co., Ltd.	n.a.	Fe_3O_4	TMSPMA	≈ 200 (CD)	n.a.	n.a.	[19]

Abbreviations: CD, core diameter; EGDM, ethylene glycol dimethacrylate; HD, hydrodynamic diameter; HEM, hydroxyl ethyl methacrylate; MMA, methyl methacrylate; TMSPMA, 3-(trimethoxysilyl)propyl methacrylate; U, unspecified, n.a., not available.

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