

Electronic Supplementary Information (ESI)

Simple one-pot fabrication of ultra-stable core-shell superparamagnetic nanoparticles for potential application in drug delivery

Tapas Sen^{a,b*}, Sarah J. Sheppard^{a,c}, Tim Mercer^d, Maneea Eizadi-sharifabad^a, Morteza Mahmoudi^{e,f} and Abdelbary Elhissi^c

^aCentre for Materials Science, School of Forensic and Investigative Sciences

^bInstitute of Nanotechnology and Bioengineering

^cSchool of Pharmacy and Biomedical Sciences

^dSchool of Computing Engineering and Physical Sciences

^eNanotechnology Research Center, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran

^fNanoBio Interactions Laboratory, National Cell Bank, Pasteur Institute of Iran, Tehran, Iran

University of Central Lancashire

Preston, PR1 2HE

United Kingdom

*Corresponding author

Email: tsen@uclan.ac.uk

Telephone: +44 1772 89 4371

Fax: +44 1772 89 4981.

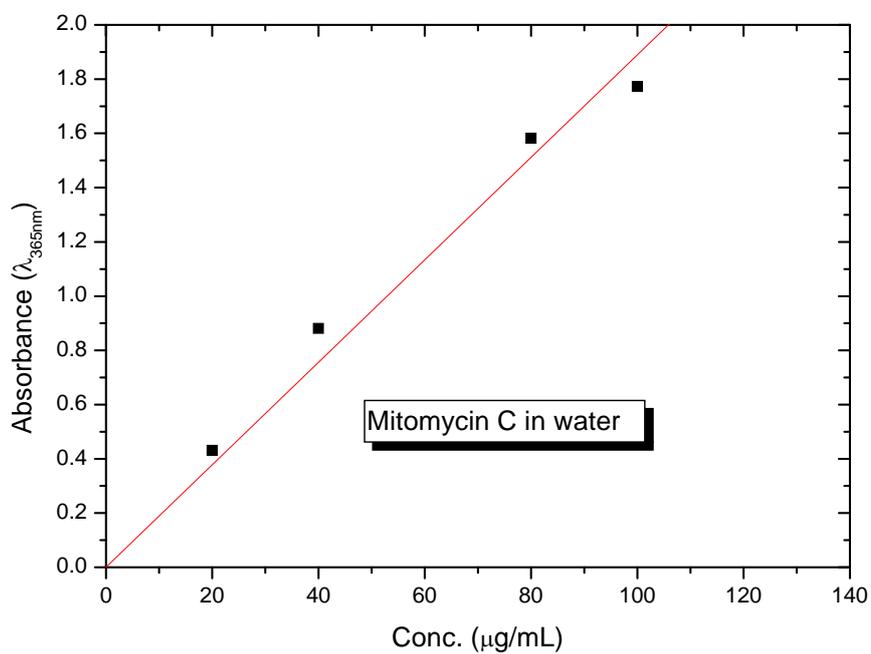


Figure S1. Standard curve of Mitomycin C in water

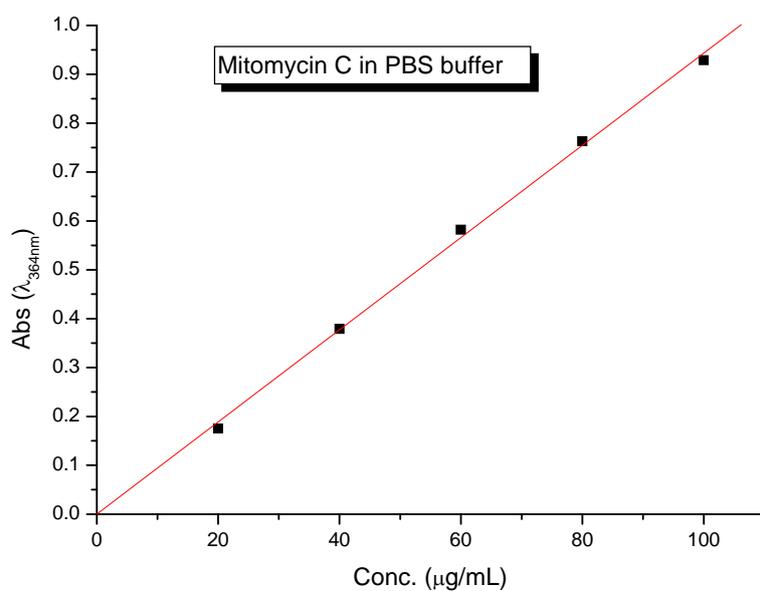


Figure S2. Standard curve of Mitomycin C in PBS buffer

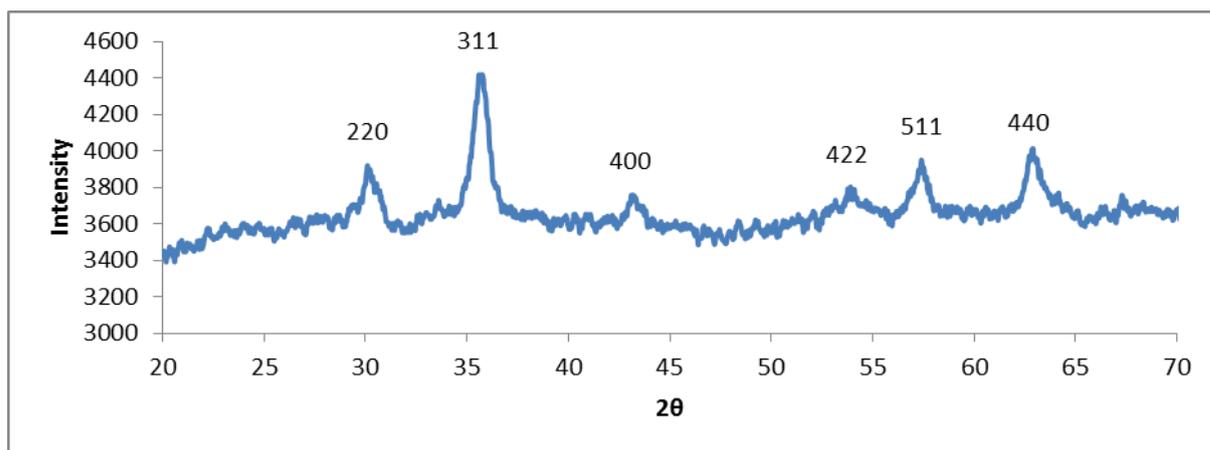


Figure S3. XRD pattern of SPIONs core

Table S1. Loading data of Mitomycin C in water (pH = 6.8) at 25⁰C

Materials	Time (hr)	MMC Conc. (µg/mL)	Conc. of nanomaterials (mg/mL)	MMC remaining in the solution (µg/mL)	Fraction of MMC remaining in the solution	MMC extracted from solution (µg)	% MMC extracted from solution	MMC loaded (µg MMC/mg of materials)
SS068	0.5	71	4	69	0.972	2	2.8	0.7
	1	71	4	68	0.958	3	4.2	1.1
	2	71	4	68	0.958	3	4.2	1.1
	3	71	4	67	0.944	4	5.6	1.4
	6	71	4	66	0.929	5	7.0	1.8
	10	71	4	64	0.901	7	9.9	2.5
	24	71	4	63	0.887	8	11.3	2.8
	48	71	4	63	0.887	8	11.3	2.8
SS065	0.5	71	4	70	0.986	1	1.4	0.4
	1	71	4	68	0.958	3	4.2	1.1
	2	71	4	51	0.718	20	26.8	6.7
	3	71	4	49	0.690	22	28.2	7.1
	6	71	4	48	0.676	23	31.0	7.8
	10	71	4	47	0.662	24	32.4	8.1
	24	71	4	47	0.662	24	32.4	8.1
	48	71	4	47	0.662	24	32.4	8.1
SS069	0.5	71	4	70	0.986	1	1.4	0.4
	1	71	4	69	0.972	2	2.8	0.7
	2	71	4	67	0.944	4	5.6	1.4
	3	71	4	67	0.944	4	5.6	1.4
	6	71	4	66	0.929	5	7.0	1.8
	10	71	4	54	0.761	17	23.9	6.0
	24	71	4	41	0.577	30	42.3	10.6
	48	71	4	40	0.564	31	43.7	10.9
SS073	0.5	71	4	70	0.986	1	1.4	0.4
	1	71	4	69	0.972	2	2.8	0.7
	2	71	4	69	0.972	2	2.8	0.7
	3	71	4	69	0.972	2	2.8	0.7
	6	71	4	69	0.972	2	2.8	0.7
	10	71	4	66	0.929	5	7.0	3.5
	24	71	4	66	0.929	5	7.0	3.5
	48	71	4	66	0.929	5	7.0	3.5

Table S2. Releasing data of Mitomycin C in PBS buffer (pH = 7.2) at 25⁰C

Materials	MMC loaded (μg MMC/mg of materials)	Time (hr)	MMC Conc. released in solution ($\mu\text{g}/\text{mL}$)	MMC released (μg MMC/mg of materials)	% MMC released /mg of materials	Fraction of MMC released in the solution
SS068	2.8	0.5	0.63	0.16	5.7	0.057
		1	1.7	0.43	15.4	0.154
		2	1.7	0.43	15.4	0.154
		3	1.7	0.43	15.4	0.154
		6	1.7	0.43	15.4	0.154
		10	1.7	0.43	15.4	0.154
		24	1.7	0.43	15.4	0.154
		48	1.7	0.43	15.4	0.154
SS065	8.1	0.5	2.2	0.55	6.8	0.068
		1	3.2	0.80	9.9	0.099
		2	5.2	1.30	16.0	0.160
		3	8.5	2.10	25.9	0.259
		6	14.6	3.70	45.7	0.457
		10	21	5.30	65.4	0.654
		24	23.3	5.80	71.6	0.716
		48	23.3	5.80	71.6	0.716
SS069	10.9	0.5	2.1	0.53	4.9	0.049
		1	2.5	0.63	5.8	0.058
		2	3.7	0.93	8.5	0.085
		3	5.8	1.45	13.3	0.133
		6	8.7	2.18	20.0	0.200
		10	11.2	2.80	25.7	0.257
		24	13.4	3.35	30.7	0.307
		48	14.7	3.68	33.8	0.338
SS073	3.5	0.5	1.2	0.30	8.6	0.086
		1	2.2	0.55	15.7	0.157
		2	2.7	0.68	19.4	0.194
		3	2.8	0.70	20.0	0.200
		6	2.8	0.70	20.0	0.200
		10	2.8	0.70	20.0	0.200
		24	2.8	0.70	20.0	0.200
		48	2.8	0.70	20.0	0.200