Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting information

pH-controlled delivery of curcumin from a compartmentalized solid lipid nanoparticle@mesostructured silica matrix

Sanghoon Kim[a], Marie-José Stébé[a], Jean-Luc Blin[a] and Andreea Pasc[a]*

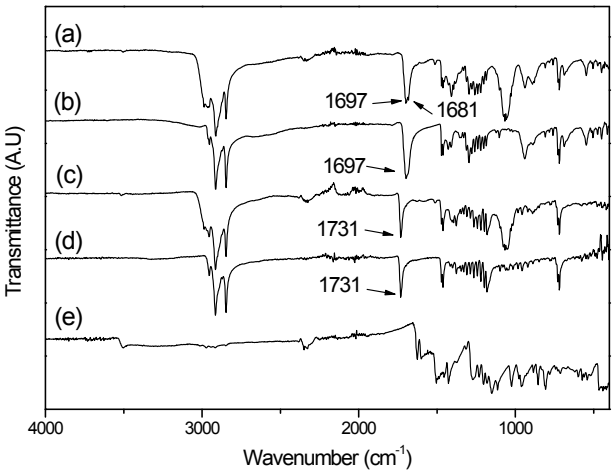


Figure SI1 Full scale FT-IR of Figure 1A (a) CU-SA-SLN (b) blank-SA-SLN (c) CU-NHP-SLN (d) blank-NHP-SLN (e) curcumin

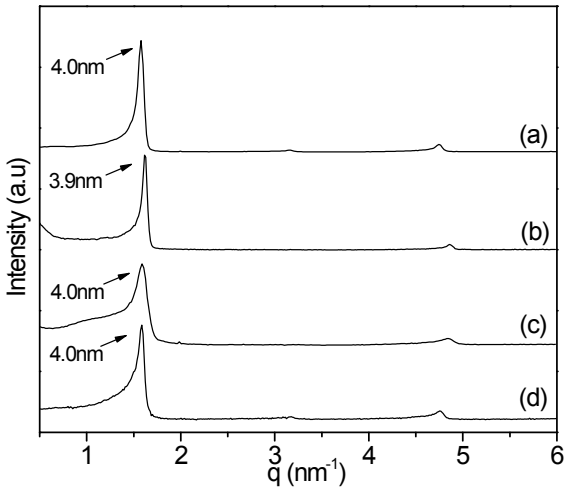


Figure SI2 Full scale SAXS of Figure 1B (a) CU-SA-SLN (b) blank-SA-SLN (c) CU-NHP-SLN (d) blank-NHP-SLN

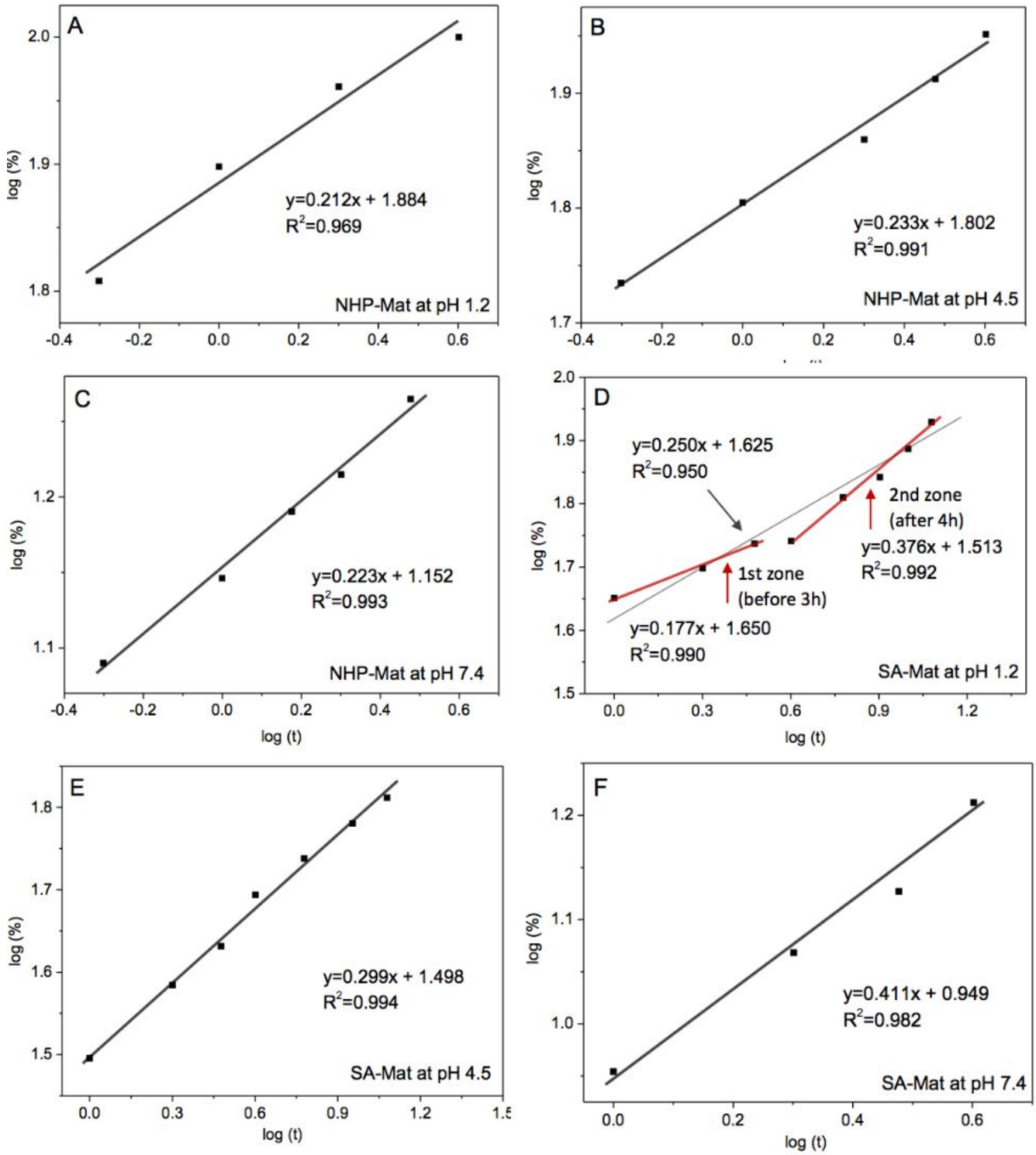


Figure SI3 Fitting graphs of curcumin cumulative release using Korsmeyer-Peppas model (Table 2)

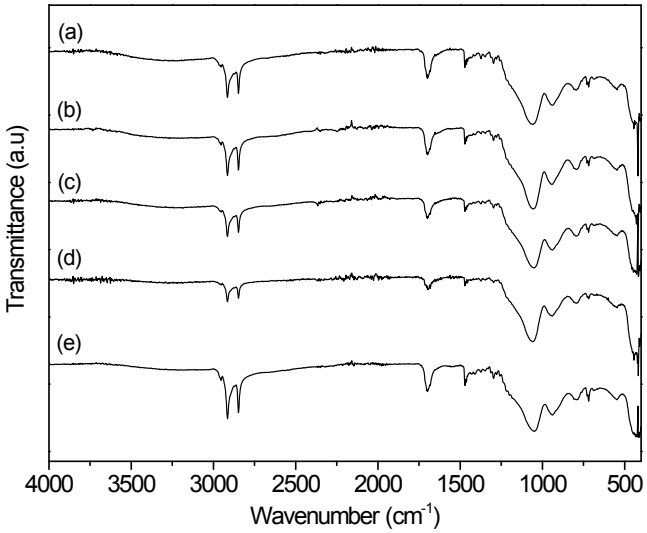
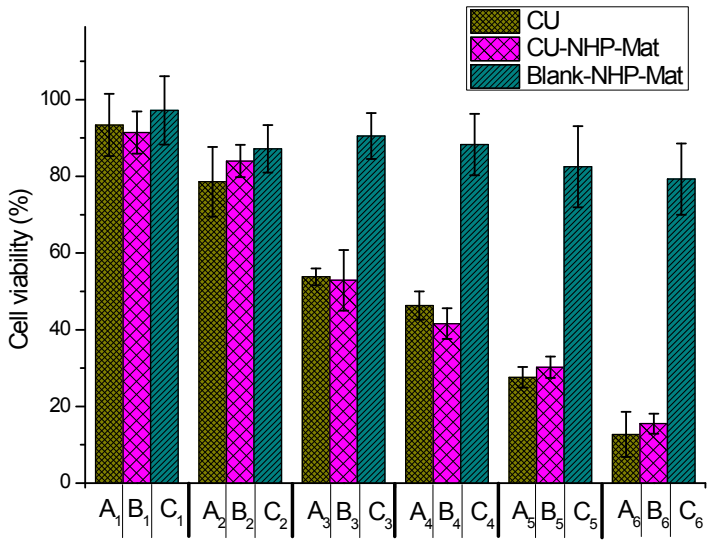


Figure SI4. Full scale IR spectra of Figure 10A. (a) as-synthesized material, (b) after 2h release at pH 1.2, (c) after 4h release at pH 1.2, (d) after 8h release at pH 1.2, (e) after 6h release at pH 7.4

Cytotoxicity experiment

Cell lines and cell culture. Human pulmonary embryonic fibroblasts were obtained from BioMerieux (Lyon, France). Cells were maintained in modified Eagle's medium (MEM, 41090, Invitrogen, France) for MRC-5 supplemented with 10% decomplemented foetal bovine serum (FBS, 10270, Lot 40Q5150K, Invitrogen, France) without antibiotics at 37 °C, 5% CO_2, under a humid atmosphere. MRC-5 cells were plated at 10^4 cells/well in 96-well plates (831835, Sarstedt, France). Forty-eight hours after plating, the growth medium was removed and replaced with the test solutions (100 µL). After 24 h exposure, viability and cytotoxicity tests were performed.

MTT assay. Viability tests were carried out using a commercially available cell proliferation reagent [3-(4,5-dimethylthiazolyl-2-yl)-2,5-diphenyltetrazolium bromide] (MTT) (135038, Sigma, France) as described previously[1]. The assay is based on the cleavage of the tetrazolium salt MTT by active mitochondrial dehydrogenases to produce an insoluble purple formazan salt. Since this conversion only occurs with viable cells, it directly correlates with cell count. Experiments were performed in 100 µL of medium in flat-bottom 96-well plates (831835, Sarstedt, France). After 24, 48, 120 and 168 h of incubation, stock MTT solution (5 mg/mL MTT in PBS) was added (10 µL per well) and plates were incubated in a humidified atmosphere with 5% CO2 at 37 °C for 4 h. Then, insoluble purple formazan was dissolved by adding 100 µL sodium dodecyl sulfate (SDS, L-5750, Sigma, France) (0.1 g/mL SDS in PBS, with 445 µL HCl 0.01 M) to each well, and incubated for 4 h more. The absorbance at A540 nm was measured with a reference wavelength of A690 nm, using an ELISA reader (Multiskan EX, Thermo Electron Corporation, France). Eight wells per dose and time point were counted in three different experiments.



	Concentration in curcumin (mg/L)			Concentration in NHP-Mat (g/L)		
	A	B	C	A	B	C
1	5	5	-	-	1.2	1.2
2	10	10	-	-	2.4	2.4
3	15	15	-	-	3.6	3.6
4	30	30	-	-	7.2	7.2
5	50	50	-	-	12	12
6	75	75	-	-	18	18

Figure SI5. *In vitro* cytotoxicity of pure curcumin (A), CU-NHP-Mat (B) and Blanc-NHP-Mat (C) in MRC-5 cell line after 24h.

1. T. Mosmann, *J. Immunol. Methods*, 1983, **65**, 55; M. Grare, M. Mourer, S. Fontanay, J.B. Regnouf-de-Vains, C. Finance and R.E. Duval, *J. Antimicrob. Chemother*., 2007, **60**, 575.