

Supporting Information

Layer by Layer Mesoporous Silica-Hyaluronic Acid-Cyclodextrin Bifunctional “Lamination”: Study the Application of Fluorescent Probe and Host-Guest Interaction in Drug Delivery Field

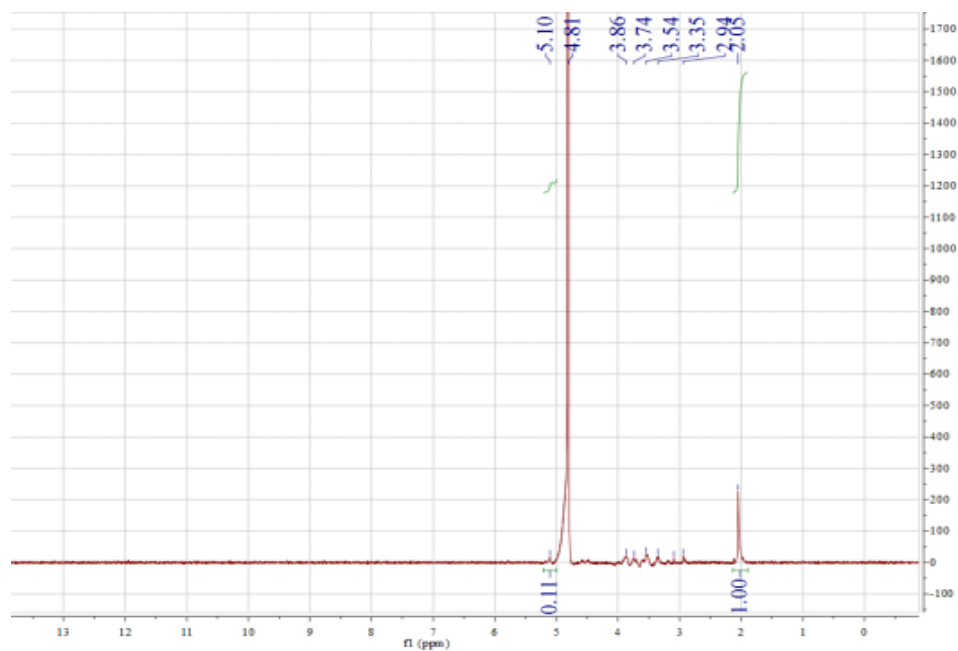


Figure S1 ¹H NMR spectrum (400 MHz, D₂O) of HA-CD (5.1 ppm)

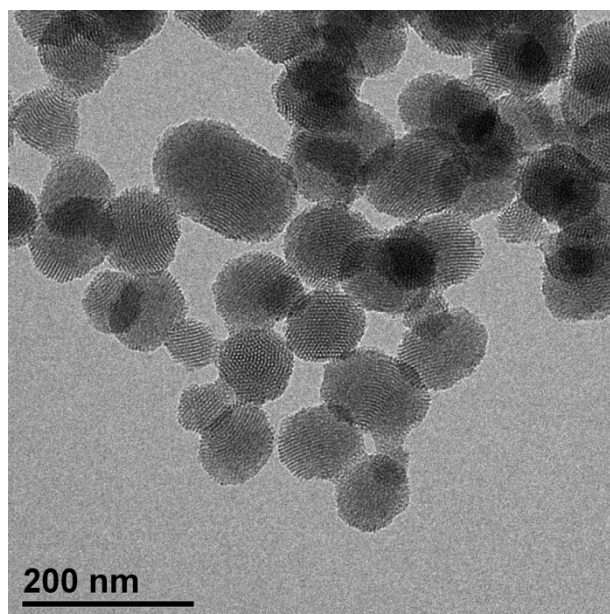


Figure S2 The TEM image of MSN

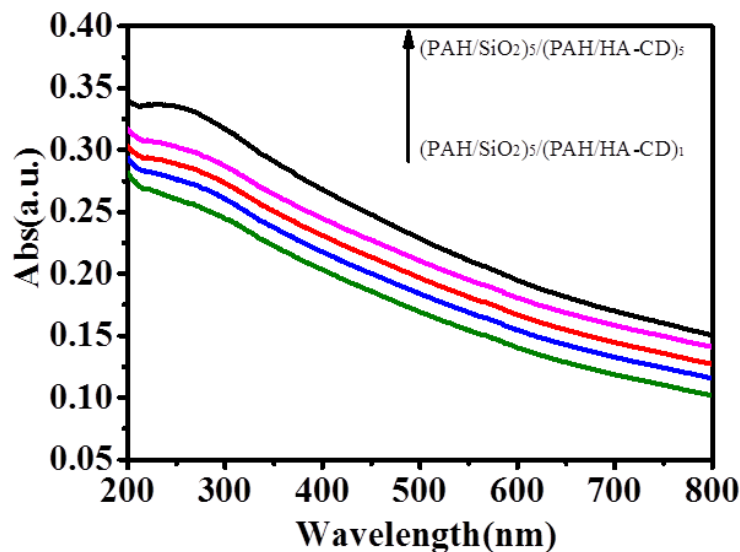


Figure S3 The UV-Vis spectra following the construction of $(\text{PAH/SiO}_2)_5/(\text{PAH/HA-CD})_5$ multilayers

Table S1 Experimental recipe for the preparation of HA/ NH_2 - β -CD

Product	HA [g]	MES [mL]	EDC [g]	NHS [g]	NH_2 - β -CD [g]	Grafting rate [%]
HA-CD	0.3	50	0.285	0.342	0.1686	4.71

Table S2 the diffusion coefficient(D) of sodium fluorescein in different concentrations of HA-CD and HA

Gel	Grafting rate	Concentration	diffusion coefficient [$\mu\text{m}^2 \text{s}^{-1}$]
HA	4.71%	3%	34.4338
HA-CD	4.71%	3%	32.4881
HA	4.71%	4%	34.1532
HA-CD	4.71%	4%	28.9492

Table S3 the diffusion coefficient(D) of FITC in different gels of HA-CD and HA

Gel	Grafting rate	Concentration	Diffusion coefficient [$\mu\text{m}^2 \text{s}^{-1}$]
HA	4.71%	3%	30.2861
HA-CD	4.71%	3%	30.2847

Table S4 the release time of fluorescent probe in different kinds of multilayer films

Lamination multilayer films	Fluorescent probe	Release time [min]
$(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_3/(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_3$	FITC-RGD	150
$(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_3/(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_3$	FITC-RGD-Ad	250
$(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_5/(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_5$	FITC-RGD	200
$(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_5/(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_5$	FITC-RGD-Ad	290
$(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_7/(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_7$	FITC-RGD	270
$(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_7/(\text{PAH/SiO}_2)_1/(\text{PAH/HA-CD})_7$	FITC-RGD-Ad	330

Table S5 The release time of fluorescent agent in different kinds of lamination films

Lamination multilayer films	Fluorescent probe	Release time [h]
(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₂₀ /(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₂₀	FITC-RGD	15
(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₂₀ /(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₂₀	FITC-RGD-Ad	27
(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₃₀ /(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₃₀	FITC-RGD	27
(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₃₀ /(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₃₀	FITC-RGD-Ad	40
(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₄₀ /(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₄₀	FITC-RGD	40
(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₄₀ /(PAH/SiO ₂) ₁ /(PAH/HA-CD) ₄₀	FITC-RGD-Ad	55