## Ordered and disordered cyclodextrins nanosponges with diverse physicochemical properties

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## High-performance liquid chromatography methods

The analysis of doxorubicin was carried by reversed phase separation on LunaTM analytical column phenomenex C18 (150×4.6mm, 5 $\mu$ m) at room temperature. The mobile phase was a mixture of Methanol and 0.1% trifluoroacetic acid at a ratio of 50:50 (v : v), and gradient elution was utilized, i.e., 1 mL/min until 14 min, linear increase to 1.5 mL/min till 20 min, then maintained for 9 min (20-29 min) before returning back to 1 mL/ min over 1 min. Detection was performed at  $\lambda$ ex/em 233 nm and volume was 20 $\mu$ L. Calibration equations were obtained using least squares regression method on the nominal concentration versus the peak height ratio of doxorubicin to the internal standard.

The analysis of captopril was carried with the phenomenox C18 column ( $150 \times 4.6$  mm, 5 µm) at a flow rate of 0.6 mL/min. The drugs were detected at column temperature of 25 °C, the injection volume of 2 µL and mobile phase was composed of 10% acetonitrile in 0.1% formic acid aqueous solution, changing linearly over 10 min to 90%, maintained for 10 min and then decreased to 10% in 1 min and then maintained for 10 min. The detection wavelength for captopril was 215 nm.

Sr.	Types of Nanosponges	PDI	Size (nm)	Zeta
No.				potential
1	α- CD NSPs (1:4)	0.50	327.6	18.9
2	α- CD NSPs (1:6)	0.47	1469	31.7
3	β- CD NSPs (1:4)	0.08	814.9	10.3
4	β- CD NSPs (1:6)	0.19	1324	1.9
5	γ- CD NSPs (1:4)	0.48	1665	-9.9
6	γ- CD NSPs (1:6)	0.26	2606	-10.8
7	Methyl-β-CD NSPs (1:4)	0.34	511	2.4
8	Methyl-β-CD NSPs (1:6)	0.41	662	5.8
9	HP-β-CD NSPs (1:4)	0.25	713	2.4
10	HP-β-CD NSPs (1:6)	0.39	1273	8.8
11	SBE-β-CD NSPs (1:4)	0.41	495	-4.4
12	SBE-β-CD NSPs (1:6)	0.42	800	-5.6

Table S-1. Size distribution and zeta potential of CD-NSPs



**Figure S-1** CNMR spectra of  $\gamma$ -CD and  $\gamma$ -CD-NSPs in comparison



Figure S-2. The SEM images of oven dried CD-NSPs with single cross-linker ratio of 1:6.



Figure S-3. The complete thermal gravitational analysis graphs with DTG curves of CD-NSPs



Figure S-4 Molecular structure of drug molecules used in absorption study



Figure S-5. Micrographs of lyophilized samples of doxorubicin loaded CD-NSPs