

Supporting Information for

## Functional Build-in Template Directed Siliceous Fluorescent Supramolecular Vesicles as Diagnostics

Jie Li<sup>a, #</sup>, Kaerdun Liu<sup>a, #</sup>, Hengyu Chen<sup>b, #</sup>, Ruoyan Li<sup>b</sup>, Markus Drechsler,<sup>c</sup> Fan Bai<sup>b\*</sup>,  
Jianbin Huang<sup>a\*</sup>, Ben Zhong Tang<sup>d\*</sup>, Yun Yan<sup>a\*</sup>

<sup>a</sup>Beijing National Laboratory for Molecular Sciences (BNLMS), College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, China.

<sup>b</sup>Biodynamic Optical Imaging Center (BIOPIC), School of Life Sciences, Peking University, Beijing 100871, China.

<sup>c</sup>University of Bayreuth, Bayreuth, D-95440, Germany

<sup>d</sup>Department of Chemistry, Division of Biomedical Engineering, Hong Kong Branch of Chinese National Engineering Research Center for Tissue Restoration and Reconstruction, the Hong Kong University of Science & Technology, Clear Water Bay, Kowloon, Hong Kong, China

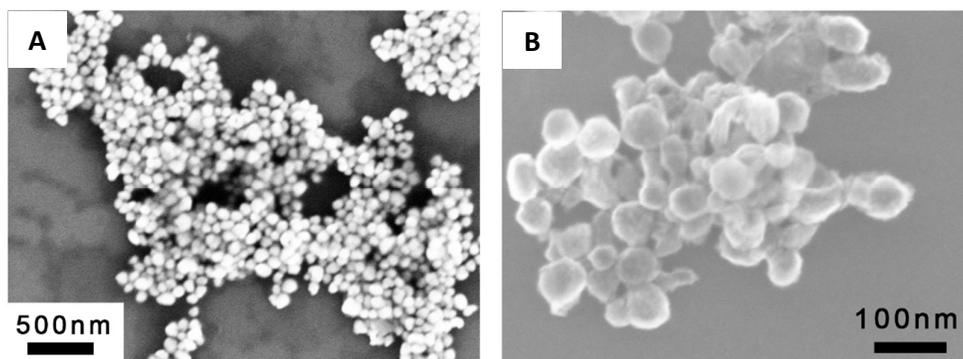
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\*Correspondence: [yunyan@pku.edu.cn](mailto:yunyan@pku.edu.cn), [jbhuang@pku.edu.cn](mailto:jbhuang@pku.edu.cn), [fbai@pku.edu.cn](mailto:fbai@pku.edu.cn), [tangbenz@ust.hk](mailto:tangbenz@ust.hk)

# These authors contribute equally.

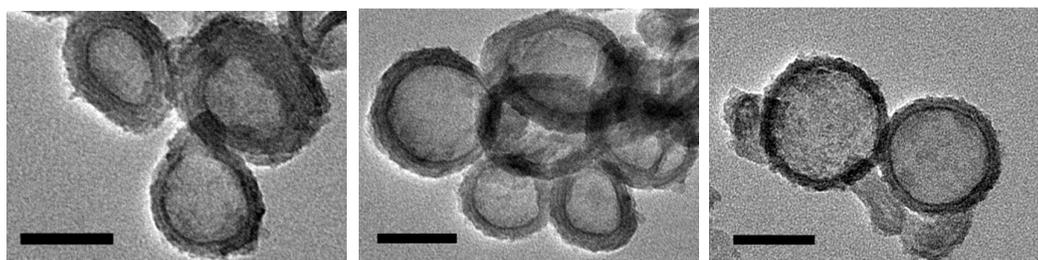
## 1. Figures S1-11

SEM images demonstrated that HSFVs were spherical particles.



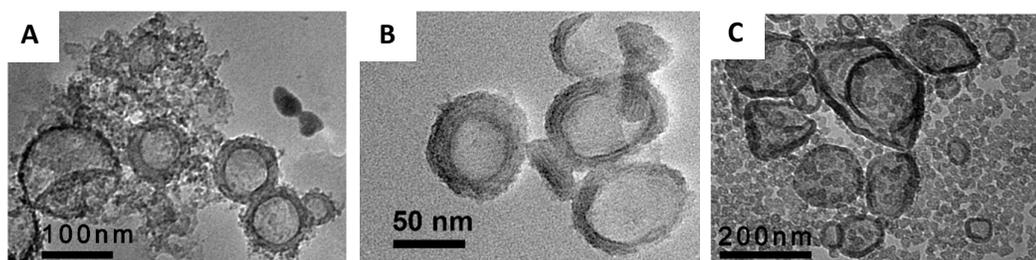
**Figure S1** SEM images of HSFVs with low magnification (A) and high magnification (B).

TEM images of FA-HSFVs suggested no noticeable difference in morphology between FA-HSFVs and HSFVs. ( $[\text{TEOS}] = [\text{FA-APTS}] = 11.2\mu\text{L/mL}$ )



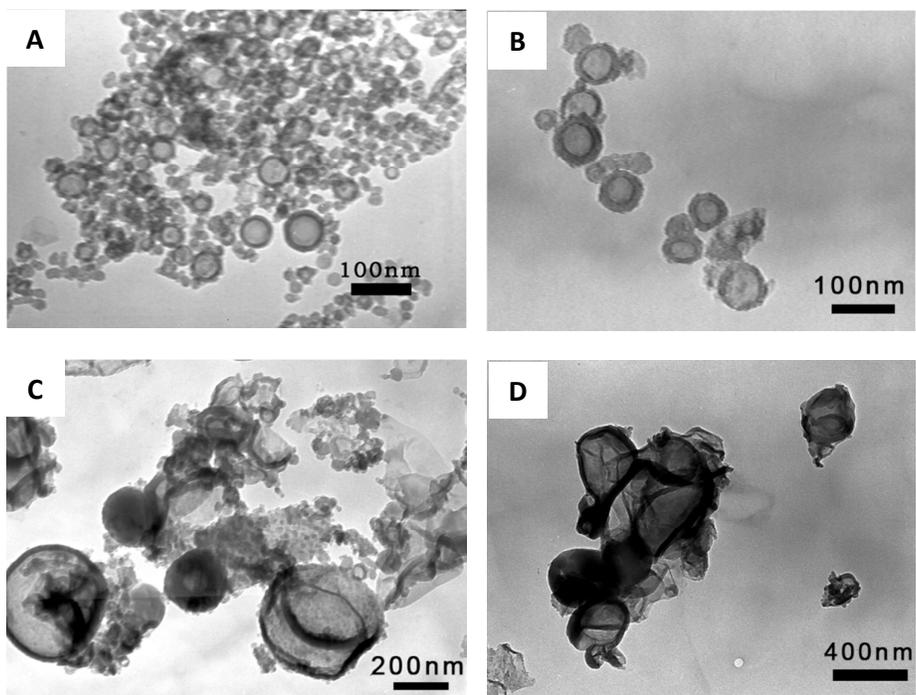
**Figure S2** TEM images of FA-HSFVs. Scale bar = 50 nm.

Molar ratio between TPE-BPA and CTAB was one of the key factors for preparing fluorescent nanocarriers. Well-defined nanocarriers with uniform morphology were only obtained at TPE-BPA: CTAB=1:8.



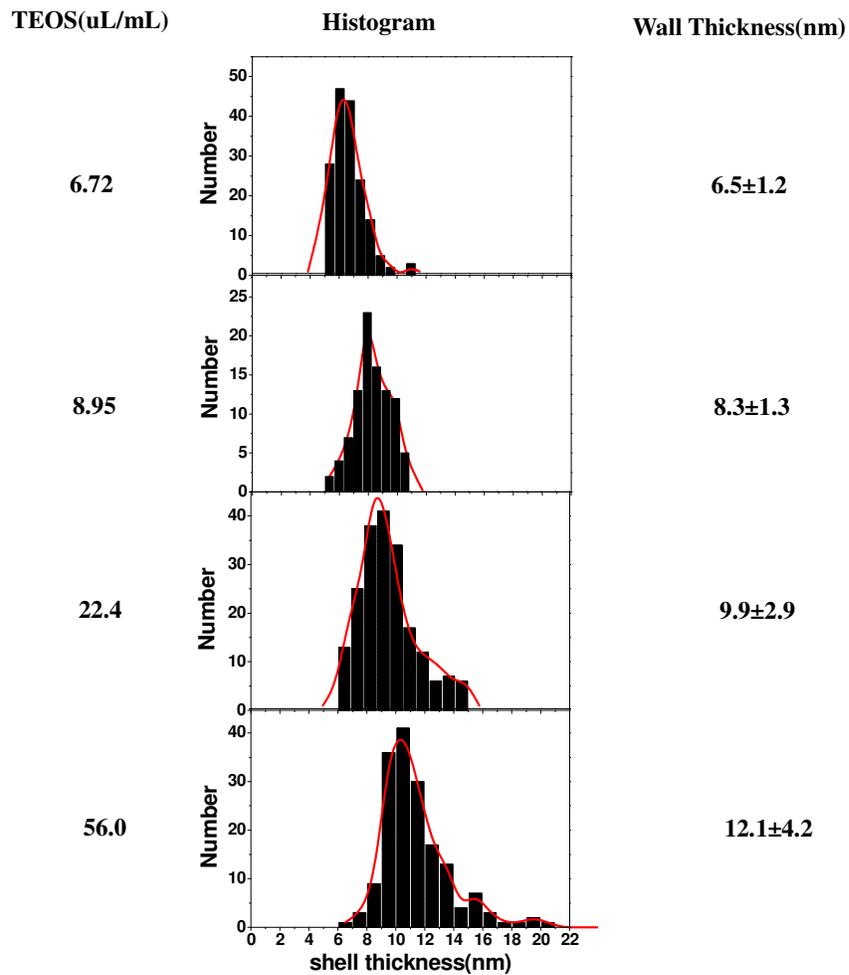
**Figure S3** TEM images of nanocarriers with different molar ratios of TPE-BPA and CTAB. The mole ratios of TPE-BPA and CTAB are 1:4 (A); 1:8 (B); 1:12 (C), respectively.  $[\text{TPE-BPA}] = 100\mu\text{M}$ .

pH was another key factor for preparing nanocarriers. Higher or lower pH environments resulted in irregular nanoparticles.



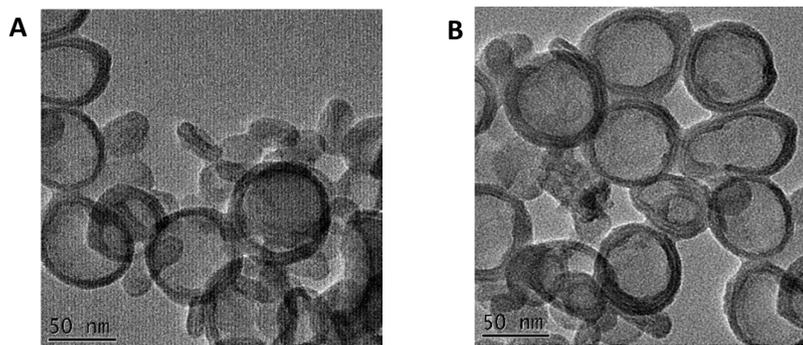
**Figure S4** TEM results of nanocarriers with different pH of TPE-BPA and CTAB. The pH are 4.5 (A); 5.6 (B); 8.0 (C); 9.6 (D), respectively. [TPE-BPA]=100  $\mu$ M, [CTAB]=800  $\mu$ M.

Analysis on the wall thickness of HSFVs with different amounts of TEOS.



**Figure S5** Statistics of thickness of HSFVs with different amounts of TEOS.

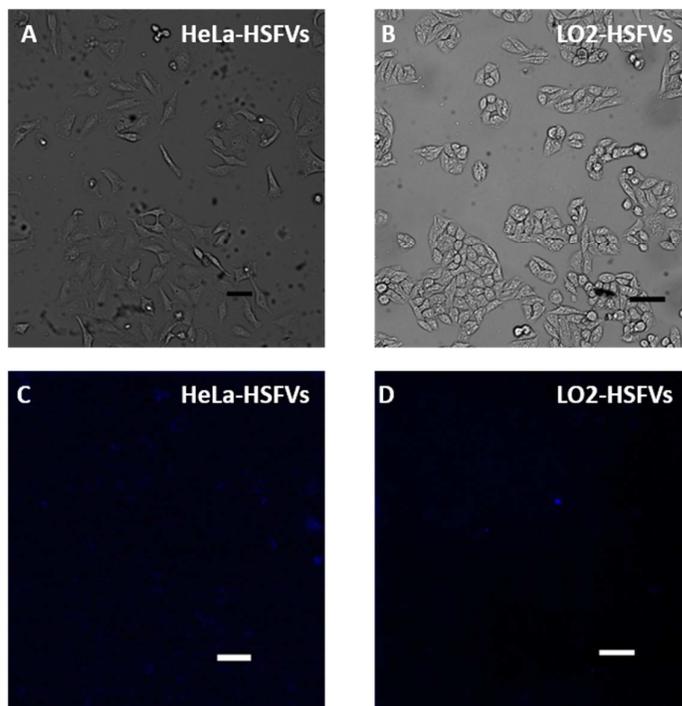
The HSFVs and FA-HSFVs were stable in water even after one year.



**Figure S6** TEM images of HSFVs (A) and FA-HSFVs (B) after one year in water.

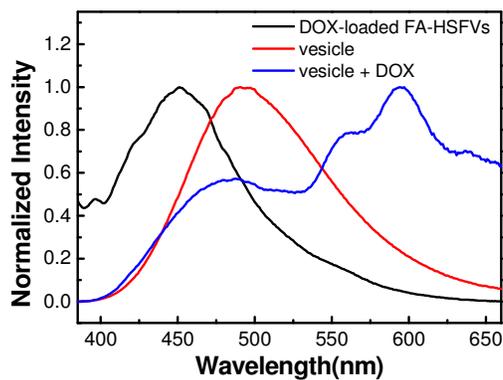
[TPE-BPA]=100  $\mu$ M, [CTAB]=800 $\mu$ M in both samples, while [TEOS]=22.4 $\mu$ L/mL for (A), and [TEOS]=[FA-APTS]=11.2 $\mu$ L/mL for (B).

CLSM images of HSFVs without FA shows only faint fluorescence in HeLa cells (and LO2 cells).

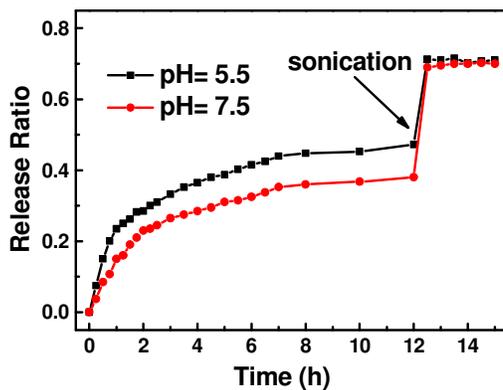


**Figure S7** CLSM images of cells with HSFVs: bright field images of HeLa (A) and LO2 (B) cells with FA-HSFVs; fluorescence images of HeLa (C) and LO2 (D) cells with HSFVs; The concentrations of HSFVs were 10  $\mu$ g/ml. Scale bar = 25  $\mu$ m.

The influence of DOX in fluorescent vesicle and FA-HSFVs.

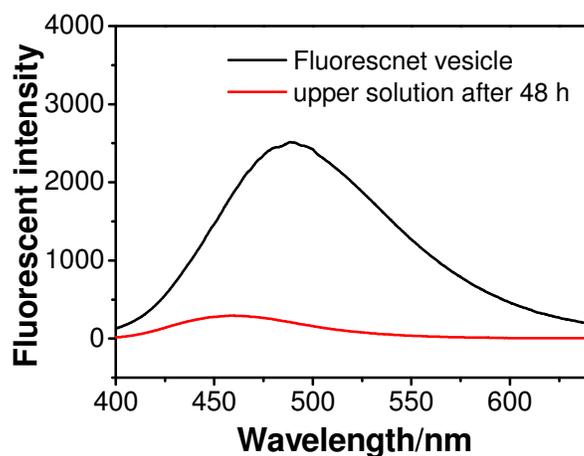


**Figure S8** Fluorescence spectrum of TPE-BPA@8CTAB vesicle solution, DOX loaded vesicles solution and DOX-loaded FA-HSFVs. Ex= 365 nm.



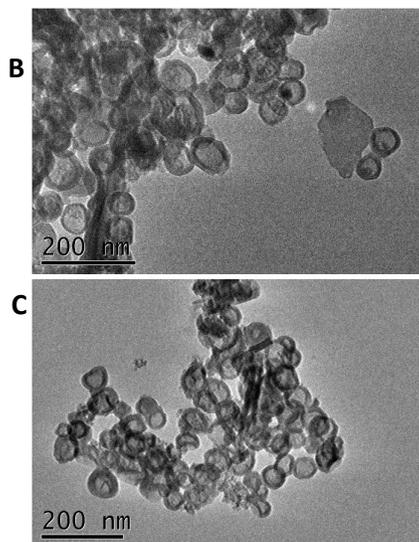
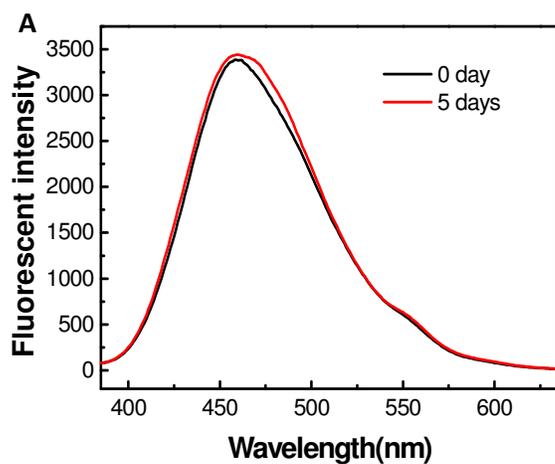
**Figure S9** The releasing of DOX in the HSFVs is promoted by about 10% at acidic pH of 5.5 when compared with that at pH 7.5.

After fluorescent silica nanocarriers were suspended in water for 48 hours, the intensity of upper solution was extremely weak, compared with the fluorescent intensity of TPE-BPA@CTAB vesicles, indicating the vesicles are rarely escaped from nanocarriers.



**Figure S10** Fluorescence spectrum of FA-HSFVs after 48 hours in water and original TPE-BPA@8CTAB solution.

The stability of FA-HSFVs



**Figure S11** (a) Fluorescent spectrum of DOX-loaded HSFVs and fluorescent results of DOX-loaded HSFVs after kept in PBS buffer for 5 days. (Dark and airy condition); (b) and (c) TEM images of DOX-loaded HSFVs after kept in PBS buffer for 5 days. (Dark and airy condition)