

## Electronic Supplementary Information

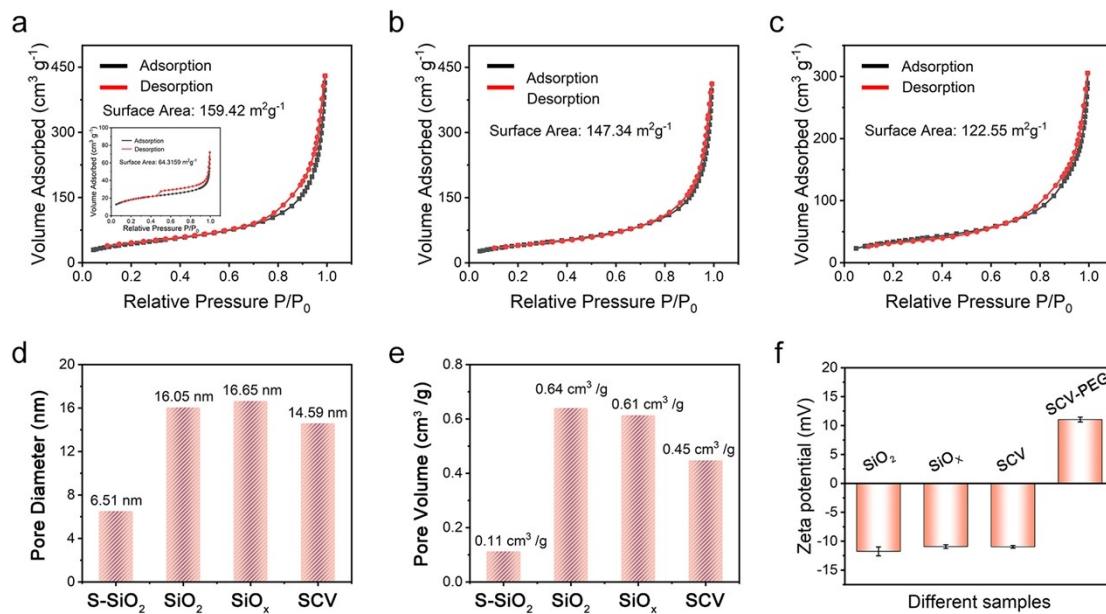
Constructing virus-like  $\text{SiO}_x/\text{CeO}_2/\text{VO}_x$  nanozyme  
for 1064 nm light triggered mild-temperature  
photothermal therapy and nanozyme catalytic  
therapy

*Ruoxi Zhao,<sup>a</sup> Rui Zhang,<sup>a</sup> Lili Feng,<sup>a</sup> Yushan Dong,<sup>a</sup> Jialing Zhou,<sup>a</sup> Songnan Qu,<sup>b</sup> Shili Gai,<sup>a</sup>  
Dan Yang,<sup>a,b,\*</sup> He Ding,<sup>a,\*</sup> and Piaoping Yang<sup>a,\*</sup>*

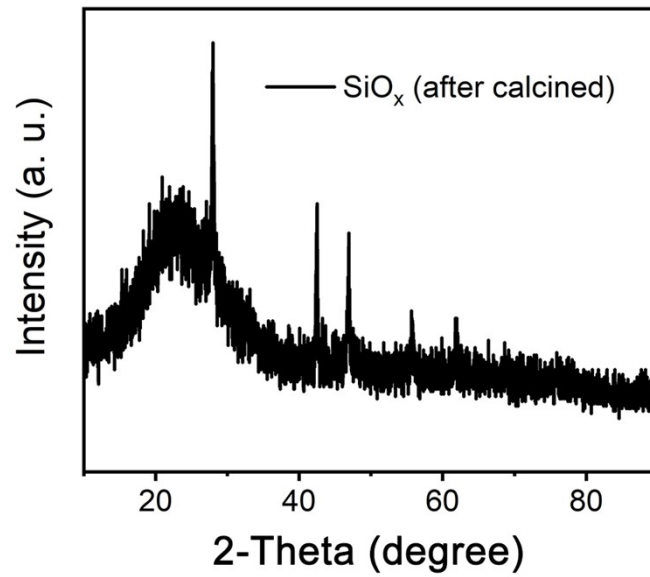
<sup>a</sup> Key Laboratory of Superlight Materials and Surface Technology, Ministry of Education,  
College of Material Sciences and Chemical Engineering, Harbin Engineering University, Harbin,  
150001, P. R. China

<sup>b</sup> Joint Key Laboratory of the Ministry of Education, Institute of Applied Physics and Materials  
Engineering, University of Macau, Macau, 999078, P. R. China

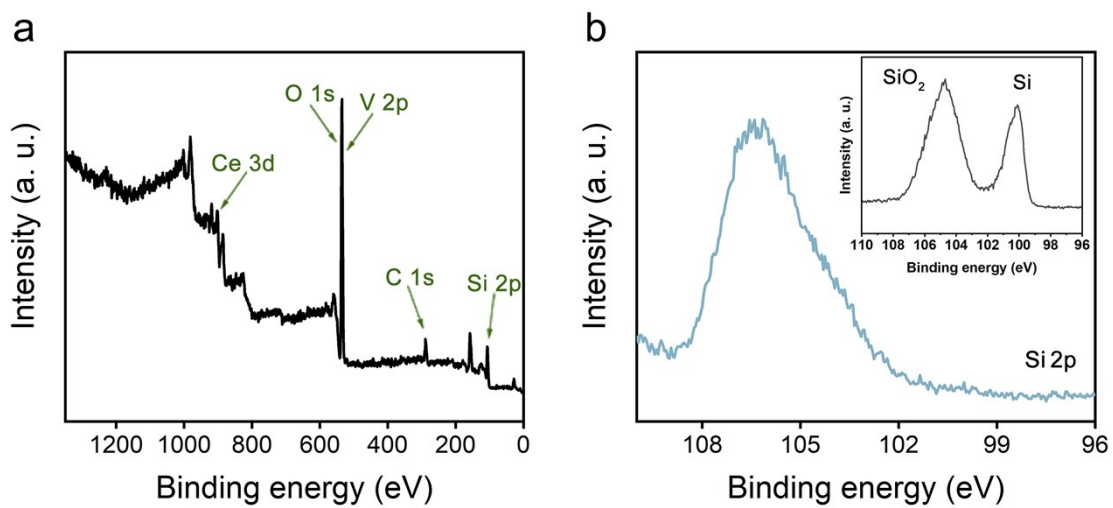
E-mail: [yangdan@hrbeu.edu.cn](mailto:yangdan@hrbeu.edu.cn); [dinghe@hrbeu.edu.cn](mailto:dinghe@hrbeu.edu.cn); [yangpiaoping@hrbeu.edu.cn](mailto:yangpiaoping@hrbeu.edu.cn)



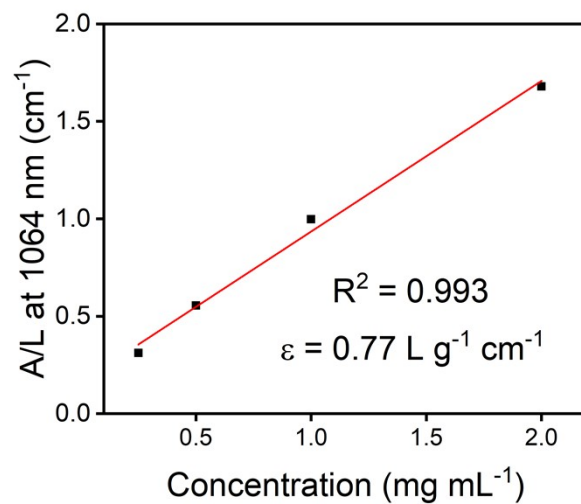
**Fig. S1**  $N_2$  adsorption–desorption isotherms of (a)  $SiO_2$  (Inset: S- $SiO_2$ ), (b)  $SiO_x$ , (c) SCV, pore size (d), pore volume distribution (e) of S- $SiO_2$ ,  $SiO_2$ ,  $SiO_x$ , SCV, and Zeta potentials (f) of  $SiO_2$ ,  $SiO_x$ , SCV and SCV-PEG.



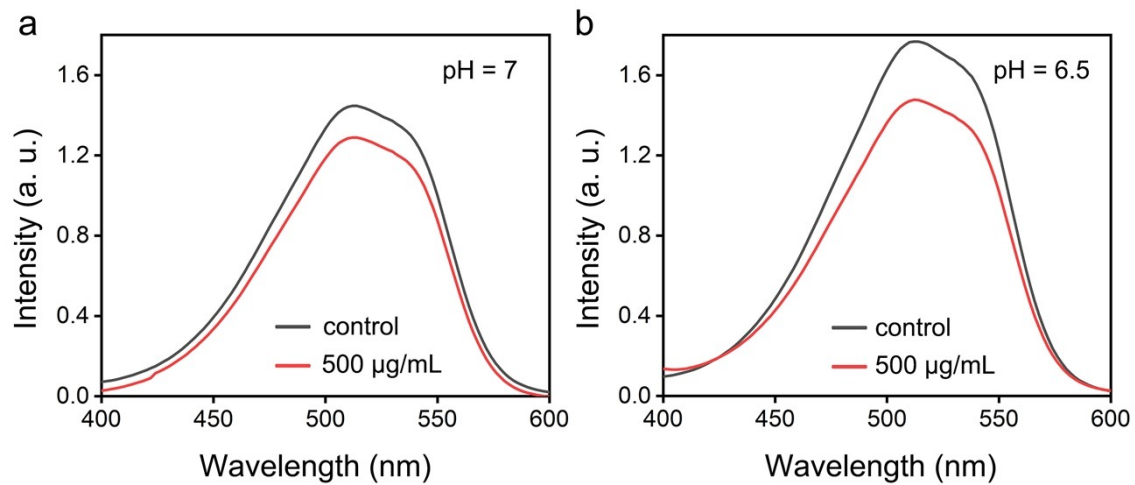
**Fig. S2** XRD of SiO<sub>x</sub> (calcinated for two times).



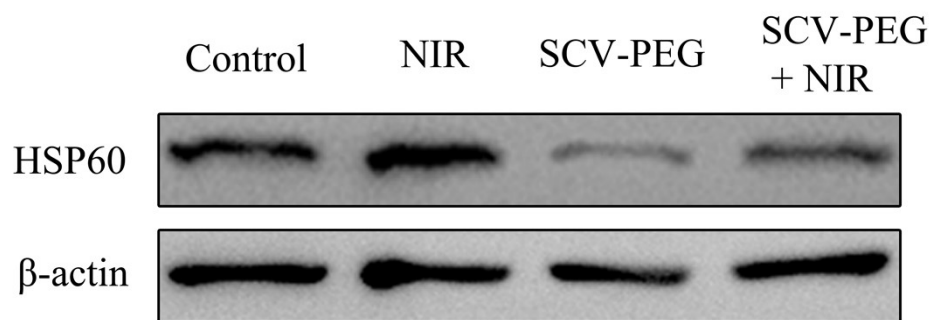
**Fig. S3** (a) XPS spectra of  $\text{SiO}_x/\text{CeO}_2/\text{VO}_x$  and (b) Si 2p XPS spectra.



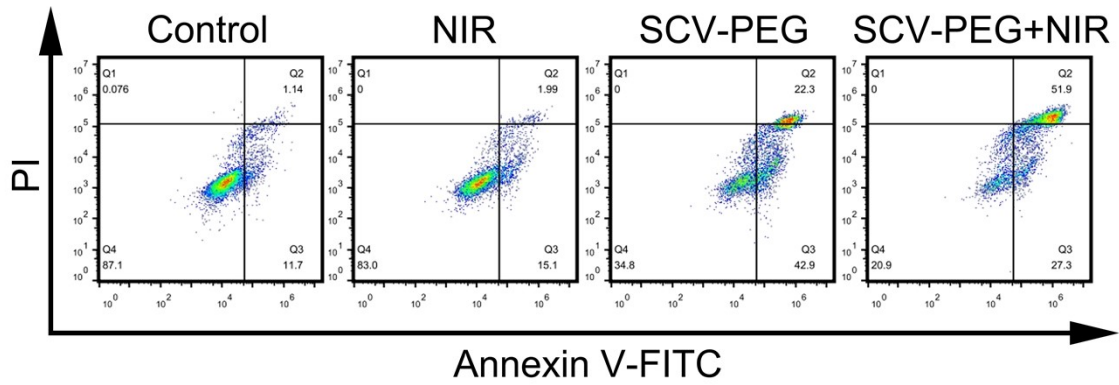
**Fig. S4** The mass extinction coefficient of the SCV-PEG nanosheets aqueous solution at 1064 nm. Normalized absorbance intensity at  $\lambda = 1064$  nm divided by the characteristic length of the cell (A/L) at varying concentrations. ( $\epsilon$  is the extinction coefficient).



**Fig. S5** UV-vis-NIR absorption spectra of dimethyl yellow with pH = 7 (a), pH = 6.5 (b).

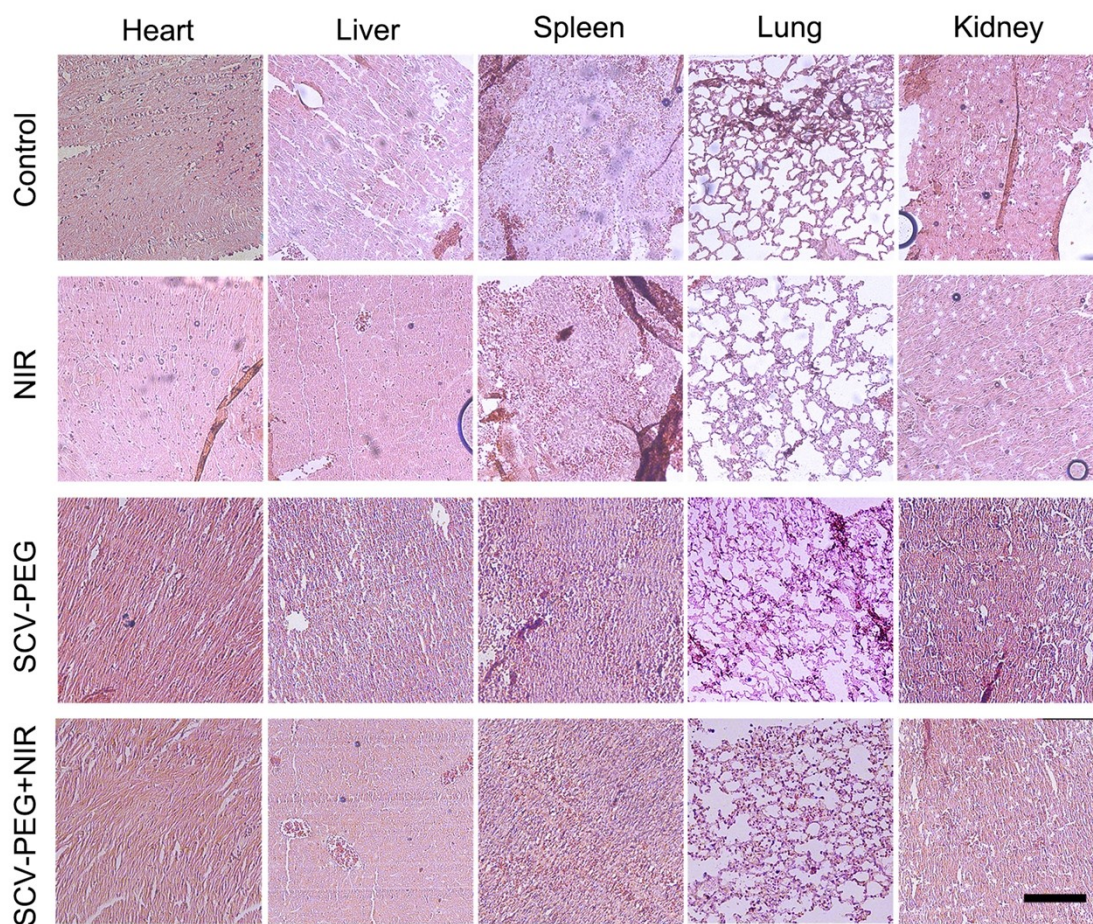


**Fig. S6** Western blots of HSP60 with different treatments.



**Fig. S7** Annexin V-FITC/PI dual staining assays of HeLa cells after incubation with various formulations.





**Fig. S8** H&E stained histological images of main organ slices from different groups of mice 14 days after treatment. Scale bar: 100  $\mu$ m.

