

Electronic Supplementary Information

Cu_{2-x}Se@mSiO₂-PEG Core-Shell Nanoparticles: a Low-Toxic and Efficient Difunctional Nanoplatfom for Chemo-Photothermal Therapy under Near Infrared Light Radiation with a Safe Power Density

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Supplementary Experimental Section

Gold nanorods were synthesized by previously described method.¹ Typically, an aqueous Au nanoparticle seed solution was prepared by adding HAuCl₄ solution to CTAB solution. After ice-cold NaBH₄ solution was injected into above mixture solution, the seed solution was acquired and kept at room temperature for at least 2 h before use. The rod growth solution was prepared as followed: The CTAB, HAuCl₄, AgNO₃ solution was mixed, hydrochloric acid was added to adjust the pH to 1-2, and followed addition of ascorbic acid. Finally, nanorod growth was initiated by injecting seed solution into the growth solution, gently mixing for 10 seconds, and then storing at room temperature for at least 6 h. The Au nanorods were collected by centrifuging and then dispersed in deionized water.

Supplementary Figures

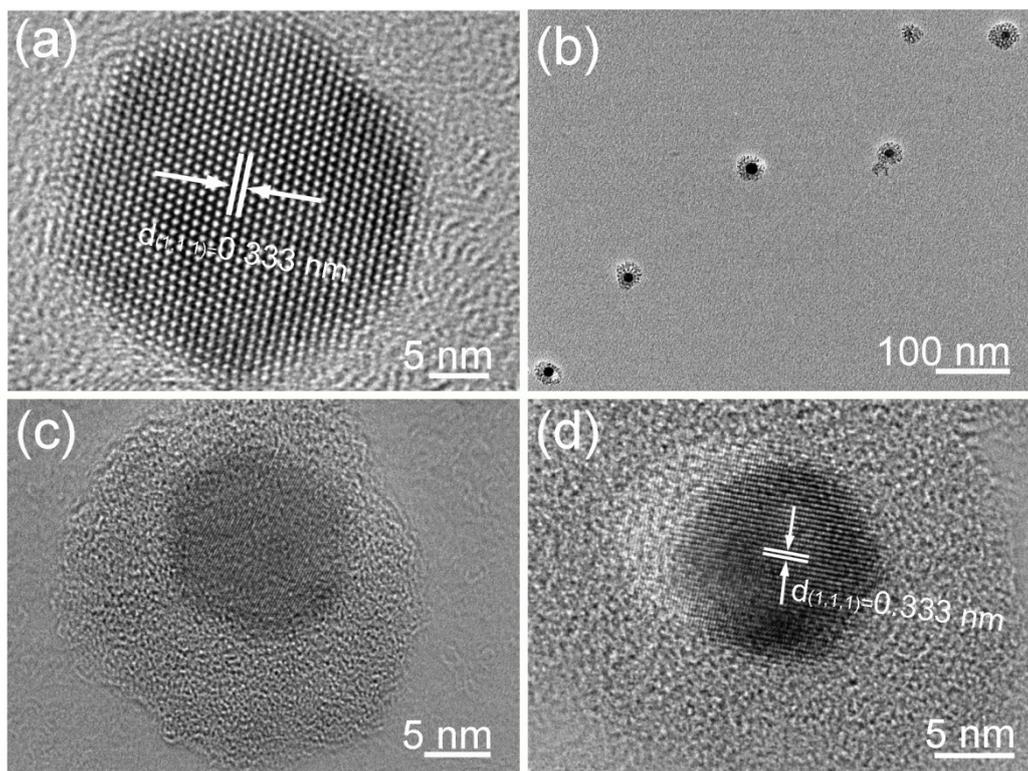


Fig. S1. (a) HRTEM images of as-prepared Cu_{2-x}Se nanocrystals, (b) low-magnification TEM images, (c) high magnification TEM and (d) HRTEM images of as-prepared $\text{Cu}_{2-x}\text{Se}@SiO_2\text{-PEG}$ nanoparticles.

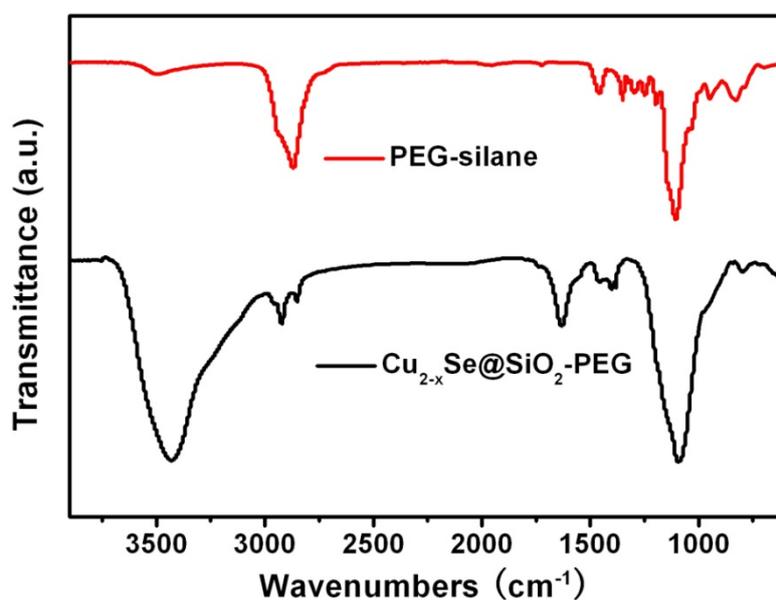


Fig. S2. The FTIR spectra of the PEG-silane and as-prepared $\text{Cu}_{2-x}\text{Se}@SiO_2\text{-PEG}$ nanoparticles.

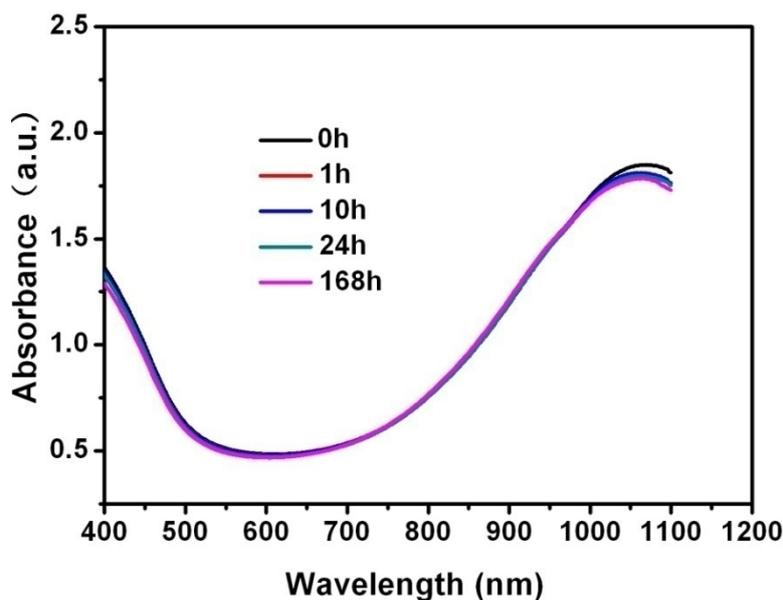


Fig. S3. Absorption spectra of the Cu_{2-x}Se@SiO₂-PEG nanoparticles' aqueous solution taken after 0 h, 1 h, 10 h, 24 h and 168 h at room temperature.

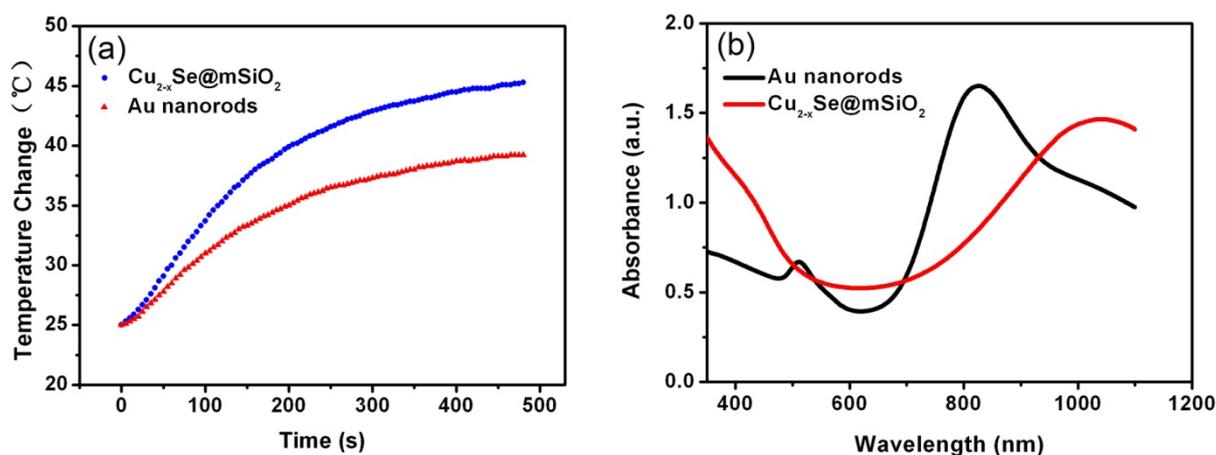


Fig S4. (a) Temperature change of the Cu_{2-x}Se@mSiO₂-PEG nanoparticles aqueous solution (48.9 ppm Cu⁺) and Au nanorods aqueous solution (50 ppm Au) under irradiation of 980 nm laser at a safe power density (0.72 W/cm²). (b) the Cu_{2-x}Se@mSiO₂-PEG nanoparticles aqueous solution (48.9 ppm Cu⁺) and Au nanorods aqueous solution (50 ppm Au).

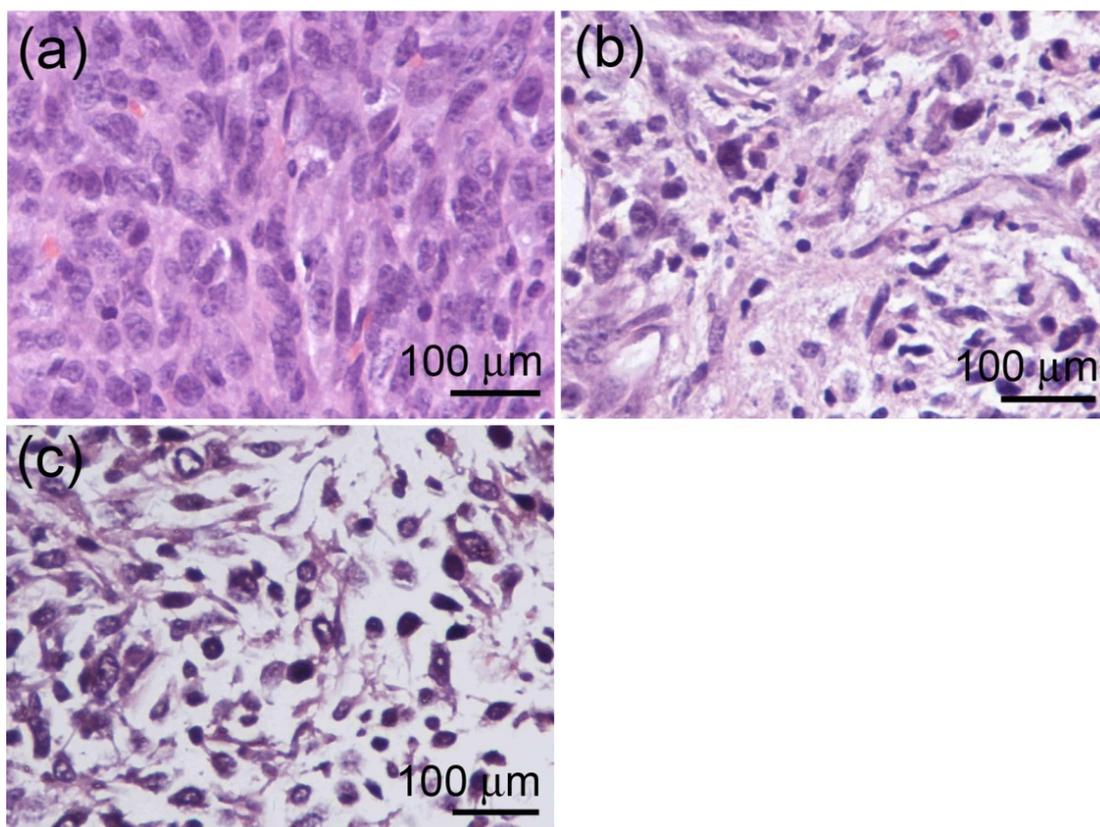


Fig. S5 High-magnification H&E-stained histological images of (a) injected saline solution, (b) injected $\text{Cu}_{2-x}\text{Se}@m\text{SiO}_2\text{-PEG}$ solution, and (c) injected $\text{Cu}_{2-x}\text{Se}@m\text{SiO}_2\text{-PEG/DOX}$ solution groups of mice after 5 min laser irradiation.

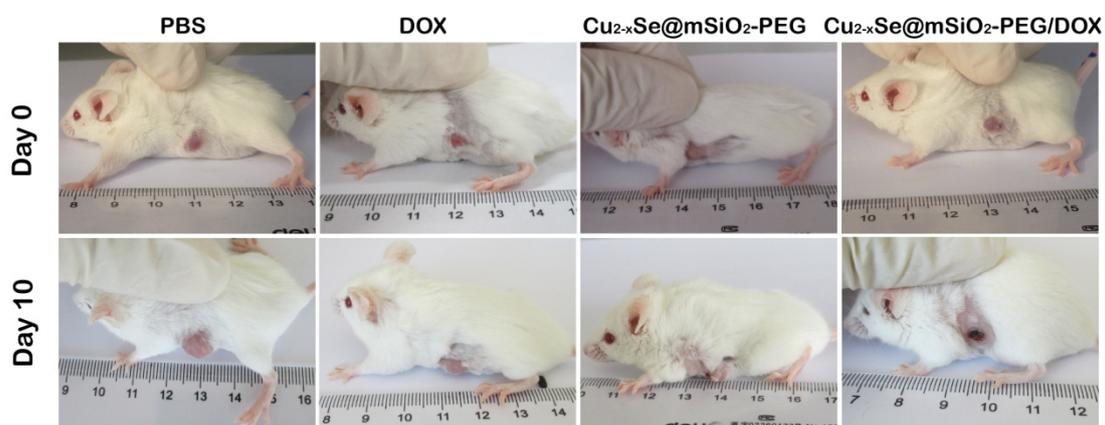


Fig. S6 Representative photos of mice bearing osteosarcoma tumors before and after PBS, DOX, $\text{Cu}_{2-x}\text{Se}@m\text{SiO}_2\text{-PEG}$ and $\text{Cu}_{2-x}\text{Se}@m\text{SiO}_2\text{-PEG/DOX}$ treatments.

References

1. Q. Tian, F. Jiang, R. Zou, Q. Liu, Z. Chen, M. Zhu, S. Yang, J. Wang, J. Wang and J. Hu, *Acs Nano*, 2011, **5**, 9761-9771.