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Supporting Information

Silicon nanowires-based multifunctional platform for chemo-photothermal synergistic cancer therapy

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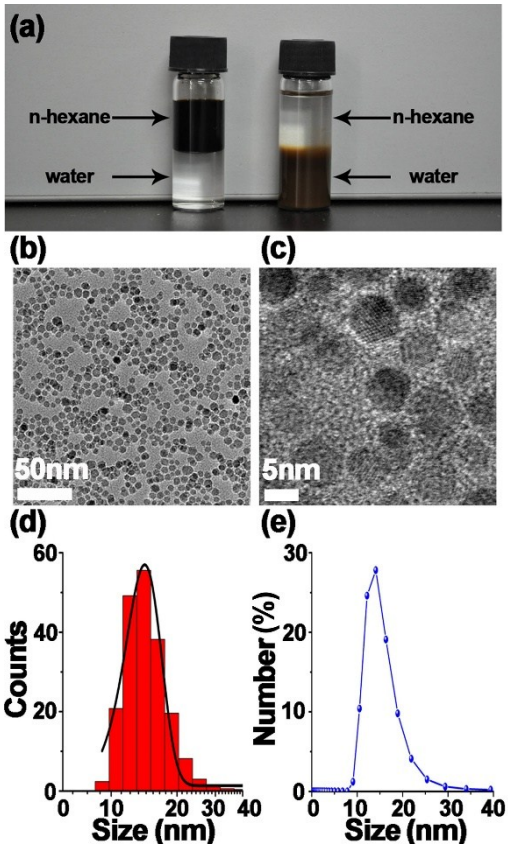

Fig. S1 Optical photographs (a) of pure IONPs (left) and dopamine coated IONPs (DA-IONPs, right). TEM images at low- (b) and high-magnification (c), histograms and the Gaussian fitting of size distribution (d), dynamic light-scattering (DLS) curve (e) of the as-synthesized DA-IONPs.

The TEM images show spherical structure of the as-synthesized DA-IONPs. The size distribution in Figure S1d, measured from 200 particles in TEM images using the software of Digital Micrograph (Gatan, U.S.A.), indicates that the as-synthesized DA-IONPs have an average diameter of 14.2 ± 2.1 nm. The corresponding hydrodynamic diameter of the as-synthesized DA-IONPs measured by dynamic light scattering (DLS) is around 14 nm.

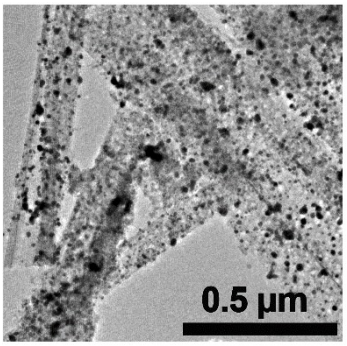

Fig. S2 A TEM image of a number of MFSiNWs.

As shown in the TEM image, the average diameter of MFSiNW is around 150 nm, a number of DA-IONPs and AuNPs are distributed on the surface of the SiNW.

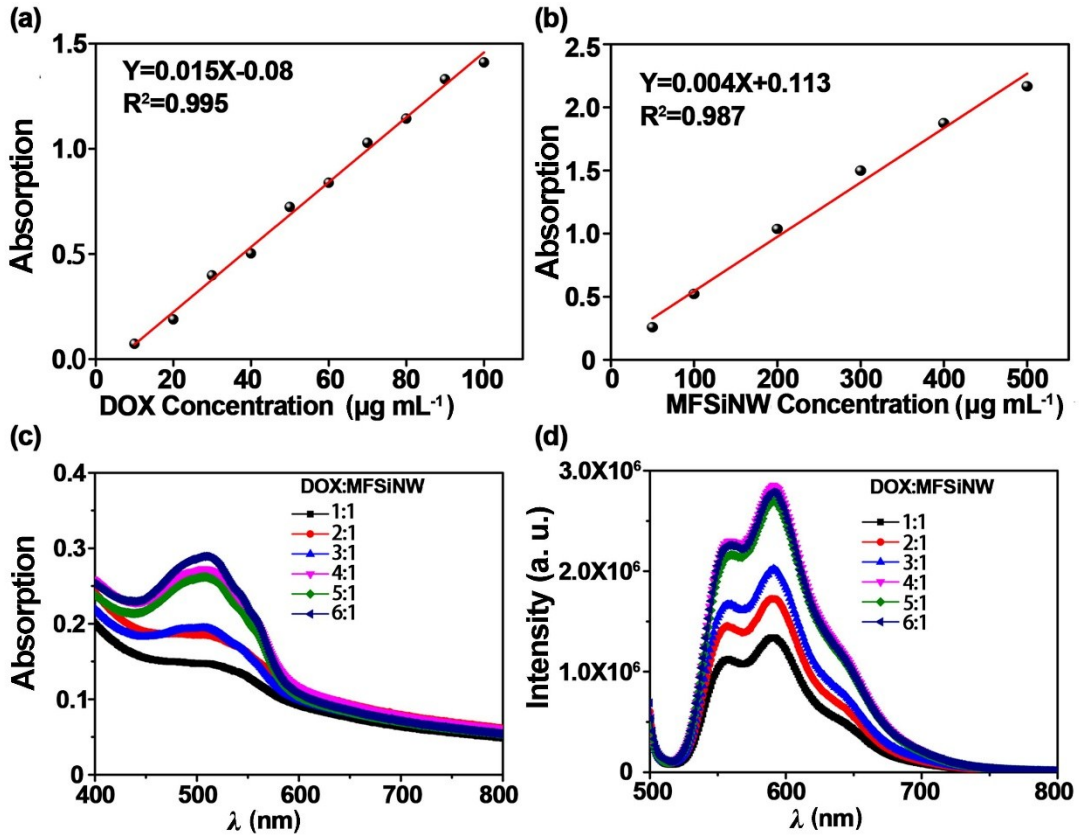

Fig. S3 (a) Absorbance at 490 nm vs. free DOX concentration (optical path = 1 cm). Solid line is the liner fit using the analysis tool in Origin software and the R^2=0.995. (b) Absorbance at 808 nm vs. MFSiNW concentration (optical path=1 cm). Solid line is the liner fit using the analysis tool in Origin software and the R^2=0.987. (c) UV-vis-NIR spectra of DOX@MFSiNW with different weight ratios between free DOX and MFSiNW (1:1, 2:1, 3:1, 4:1, 5:1, 6:1). (d) Fluorescence spectra of DOX@MFSiNW with different weight ratios between free DOX and MFSiNW (1:1, 2:1, 3:1, 4:1, 5:1, 6:1).

An established standard curve is employed for the measurement of DOX and MFSiNW concentration. In our experiments, DOX is mixed with MFSiNW in phosphate buffer (PB) solution with different weight ratios between free DOX and

MFSiNW (1:1, 2:1, 3:1, 4:1, 5:1, 6:1) overnight at pH 9 to prepare DOX@MFSiNW complex. The UV-vis-NIR absorption spectra of DOX@MFSiNW show a peak at 490 nm, which is ascribed to DOX. Moreover, the PL spectra of DOX@MFSiNW contain the characteristic PL peak of DOX at λ_{max}≈600 nm under irradiation by 488 nm excitation wavelength.

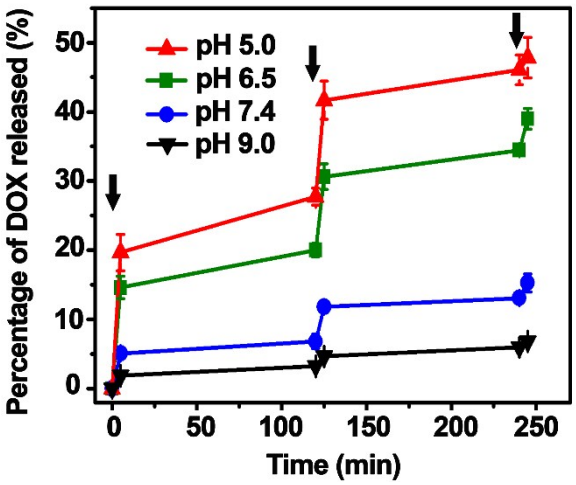

Fig. S4 NIR-triggered release of DOX from MFSiNW. The DOX@MFSiNW complex solutions (DOX: 450 μg mL^{-1}, MFSiNW: 300 μg mL^{-1}) at pHs 5.0, 6.5, 7.4 and 9.0 were irradiated with an 808 nm high-power laser (1 W cm^{-2}) for three times (5 min per time) at different time points (0, 120 and 240 min) indicated by the black arrows. Error bars are based on at least triplicate measurements.

As shown in the Fig. S4, significant release of DOX from MFSiNW at a series of pHs (*i.e.*, 5.0, 6.5, 7.4 and 9.0) could be triggered by an external 808 nm laser irradiation, especially in acidic (pH = 5.0 or 6.5) environment. Typically, compared to untreated groups (Fig. 4, ~53% or ~42% of DOX molecules are released at pH 5.0 or 6.5 during 24-h incubation, respectively), the treatment of laser irradiation results in ~48% or 39% of DOX releasing from MFSiNW at pH 5.0 or 6.5, respectively. Such NIR-triggered increased release of DOX from MFSiNW could be ascribed to the reduction of the hydrophobic interaction between DOX molecules and the SiNW .[1-3]

References

[1] X. J. Yang, X. Liu, Z. Liu, F. Pu, J. S. Ren and X. G. Qu, *Adv. Mater.*, 2012, **24**, 2890-2895.

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