Supplementary Information

A facile route to core-shell nanoparticulate formation of arsenic trioxide for effective solid tumor treatment

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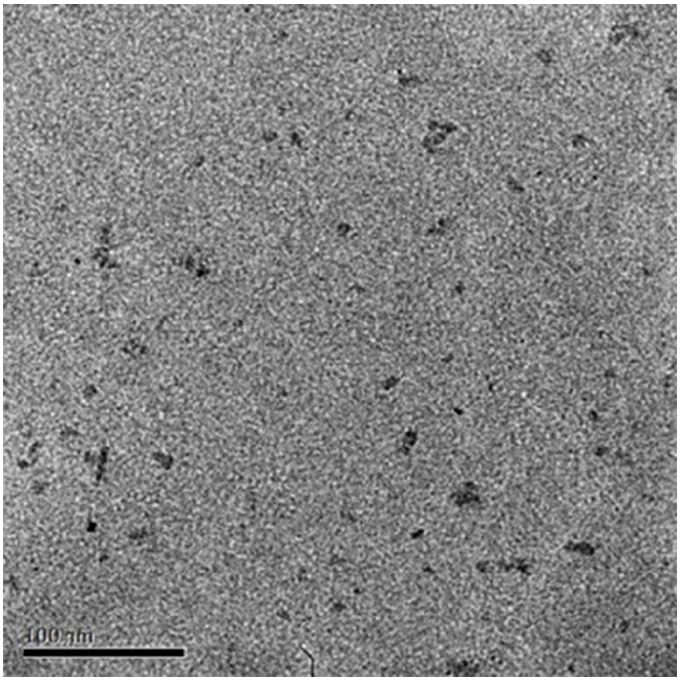

Fig. S1 TEM image of $NiAsO_x$ nanoparticles. Scale bar, 100 nm.

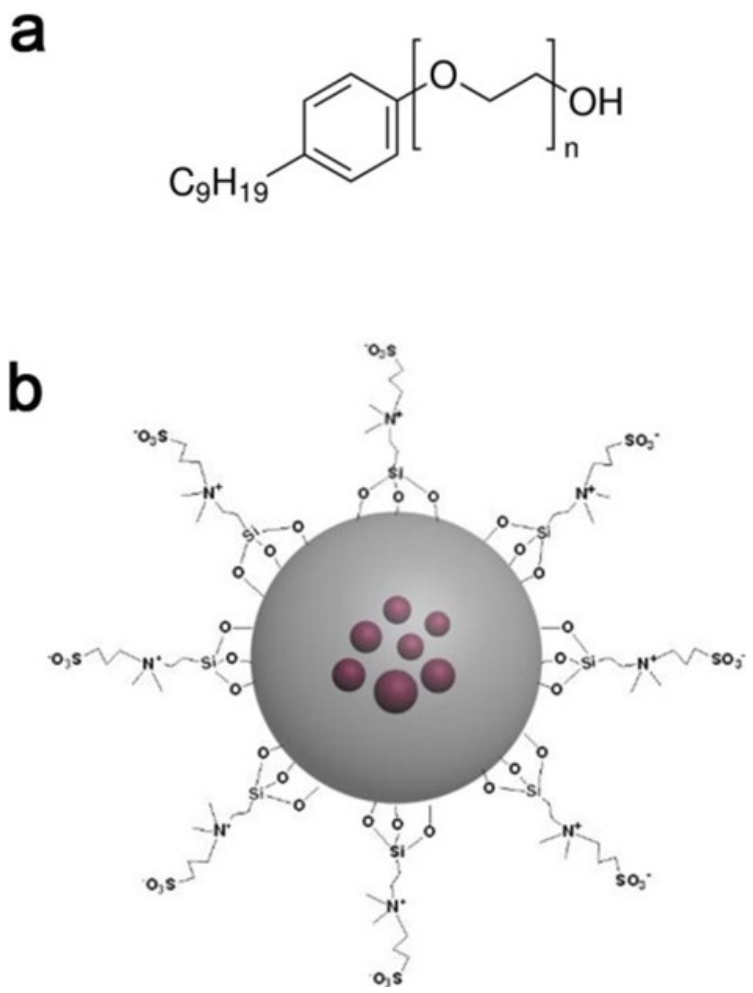

Fig. S2 (a) Molecular structure of Igepal Co-520; (b) Scheme of $NiAsO_x@SiO_2$-ZW nanocomposites with the sulfobetaine siloxane zwitterion molecules on surface.

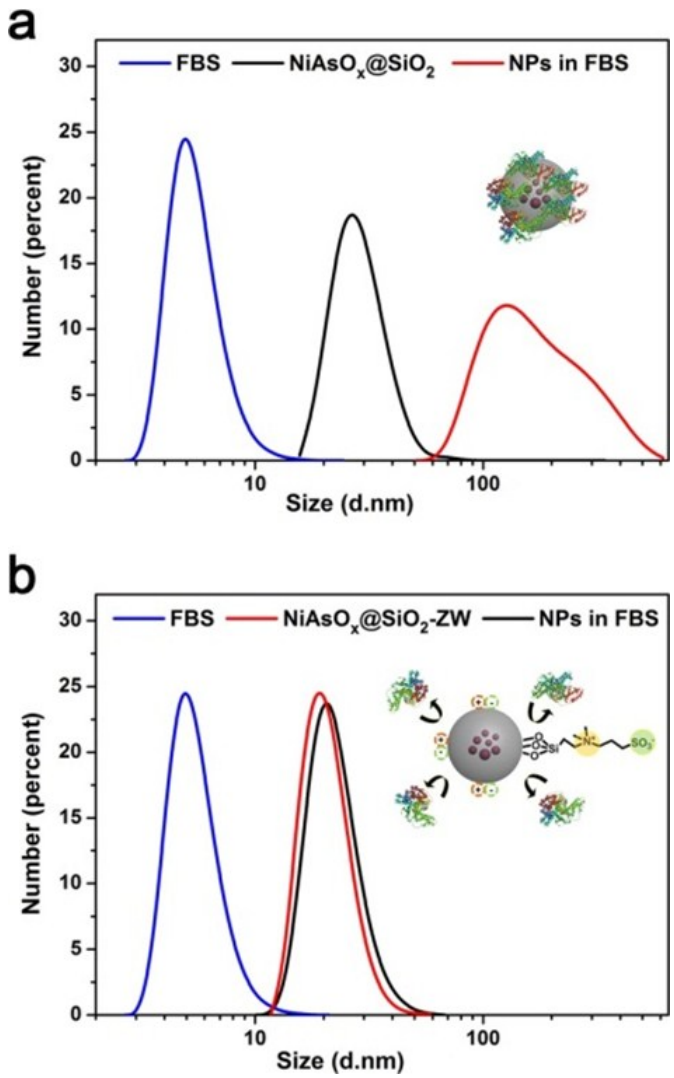

Fig. S3 Particle size distribution for $NiAsO_x@SiO_2$ (a) and $NiAsO_x@SiO_2$-ZW (b) nanocomposites in the presence and absence of 20% (v/v) fetal bovine serum (FBS) after 48 h.

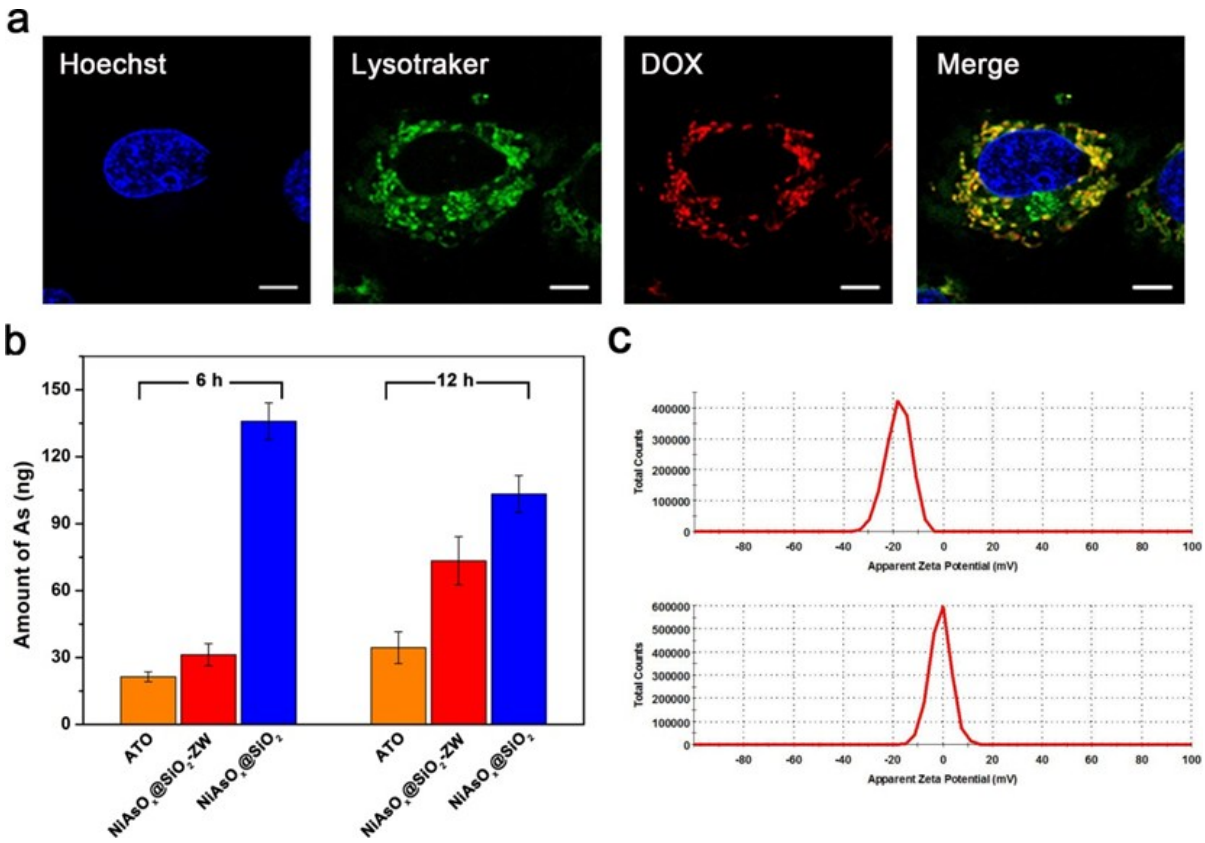

Fig. S4 (a) Confocal fluorescence imaging of HuH-7 cells treated with $NiAsO_x@SiO_2$-DOX (4 μM DOX) for 6 h, scale bars: 7.5 μm. Hoechst 33342 and LysoTracker green were used to stain cell nuclei (blue) and lysosome (green), respectively. (b) Total amount of As ions in Huh-7 cancer cells incubated with free ATO, $NiAsO_x@SiO_2$ and $NiAsO_x@SiO_2$-ZW for 6 h or 12 h. The concentration of As was tested by ICP-MS (n = 3/group). (c) The zeta-potential analysis of $NiAsO_x@SiO_2$ (upper) and $NiAsO_x@SiO_2$-ZW (below) in PBS buffer.

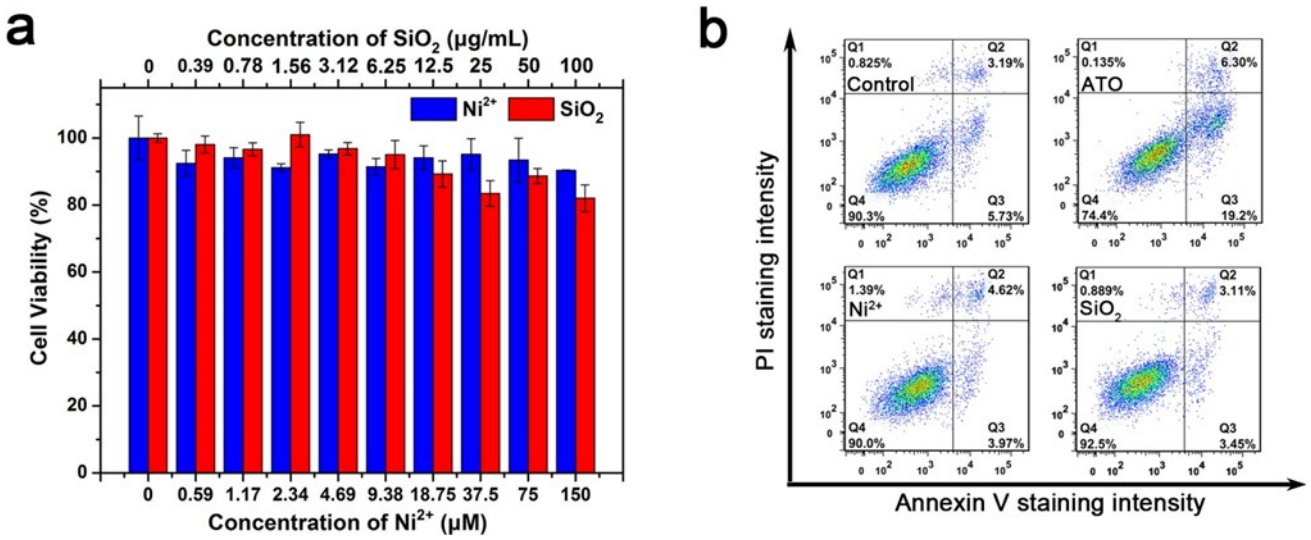

Fig. S5 (a) The cytotoxicity of Ni ions and SiO_2 nanoparticles against Huh-7 cell after incubation for 24 h. (b) Quantitative flow cytometric analysis of Huh-7 cells after treatment with PBS, ATO (10 μM), Ni ions (150 μM) and SiO_2 (100 μg/mL) for 24 h, respectively. Cells were stained with propidiumiodide (PI) and Annexin-V for recognizing the phosphatidylserine presented on apoptosis cells at room temperature.

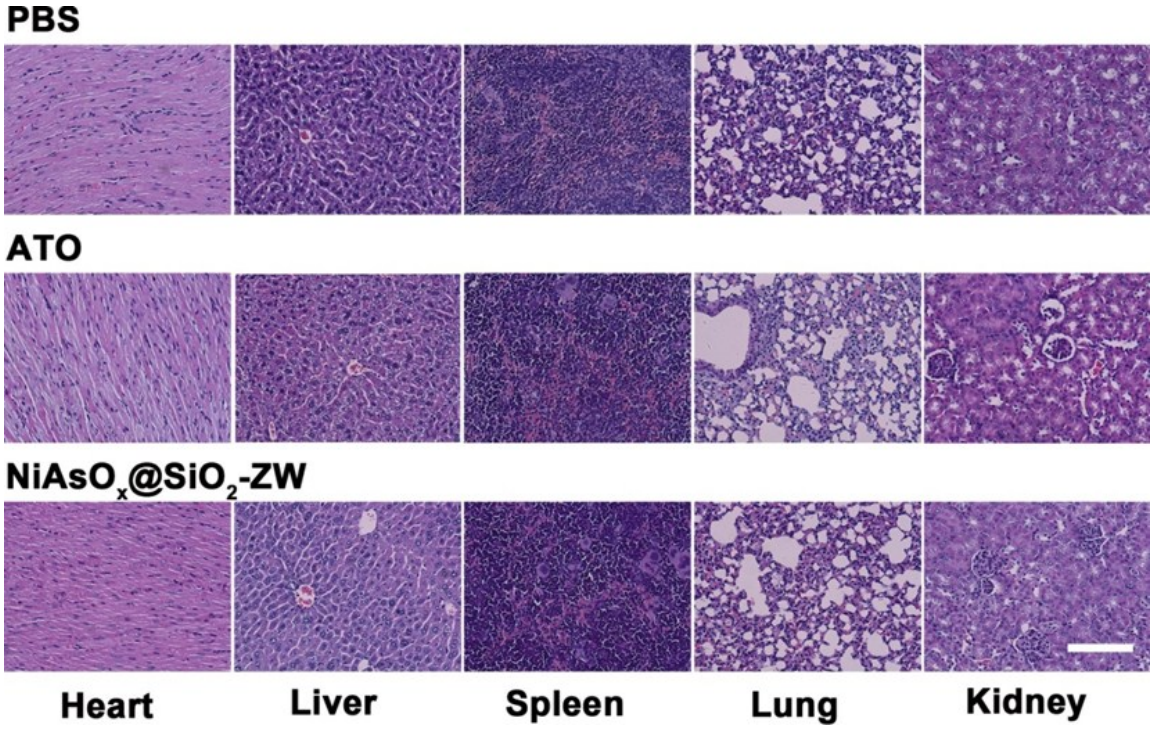

Fig. S6 Histopathology of mouse tissues following an intravenous injection of PBS, ATO, $NiAsO_x@SiO_2$-ZW with the dose of 2.0 mg As per kg via tail vein. Representative sections of various organs taken from mice were stained by hematoxylin and eosin (H&E) at 24 h post-injection. Scale bar: 100 μm.