Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary data

Nanomaterial-mediated photothermal cancer treatment: the pivotal role of cellular uptake in photothermal therapeutic efficacy

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Experimental Detail

Concentration conversion of Au nanomaterials from mg/L to particles/L

The Au ion concentration for each nanomaterial was measured using inductively-coupled plasma (ICP) analysis. Au ion concentrations were measured by ICP in terms of mg/L and the concentration could be converted to mmole/L and atoms/L (1 mole = 6.02×10^{23} atoms). The average size (i.e., length and width) of Au nanorods could be determined by TEM images. We assumed Au nanorods were cylinder structures to calculate the volume of a single Au nanorod, and the volume of a single Au atom could be calculated based on its diameter of an Au atom. Dividing the volume of one Au nanorod by the volume of one Au atom obtains the number of Au atoms contained in a single Au nanorod. We assumed that N Au atoms could form one Au nanorod. Therefore, the Au ion concentration (atoms/L) could be converted to particles/L after dividing the Au ion concentration (atoms/L) by N. For silica@Au nanospheres, the same calculation method was used to determine the number of particles. Notably, the structure of silica@Au nanospheres was assumed to be a sphere and silica@Au nanosphere only measured the volume of the Au shell.

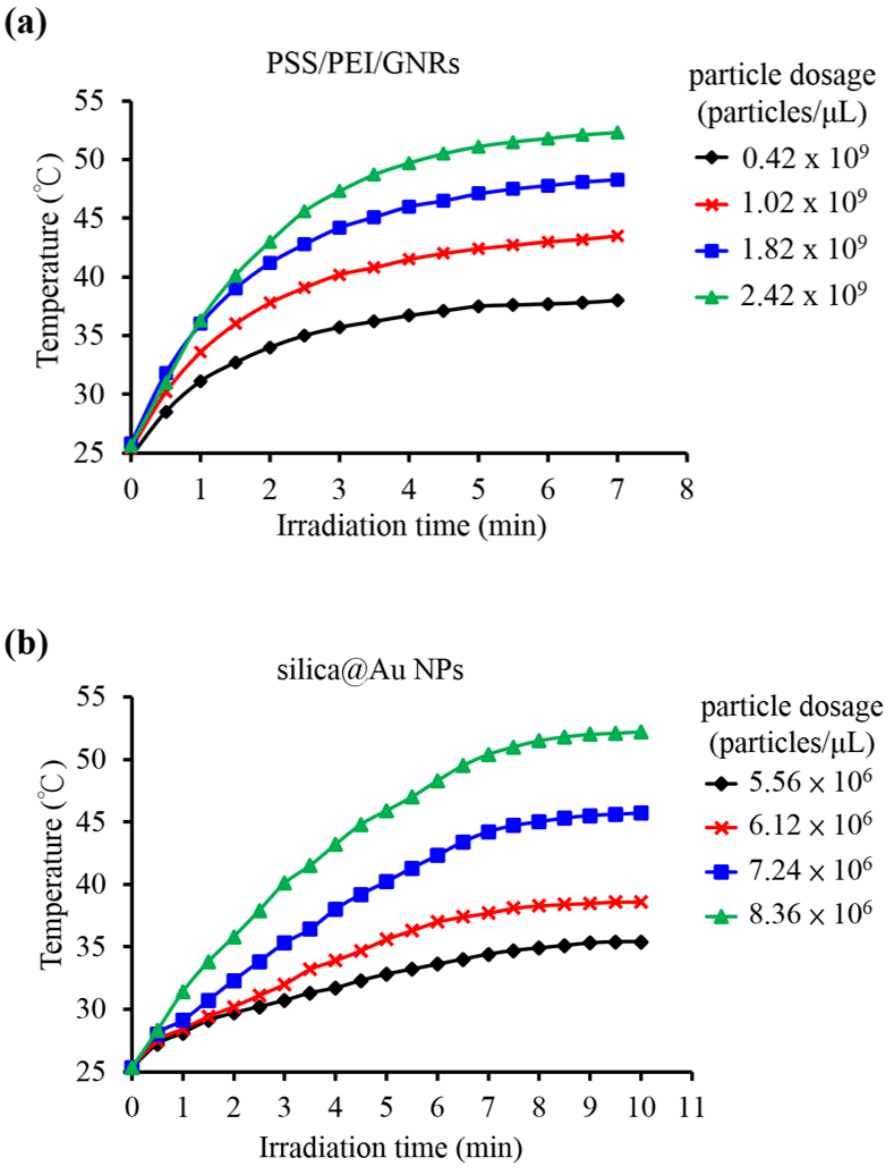

Figure S1. Temperature elevation profiles of 100 μL deionized water incubated with (a) PEI/PSS/Au NRs with a series of particle dosages (particles/μL) and (b) silica@Au NSs with a series of particle dosages (particles/μL). All samples were irradiated using an 808 nm CW laser (30 W/cm^2)

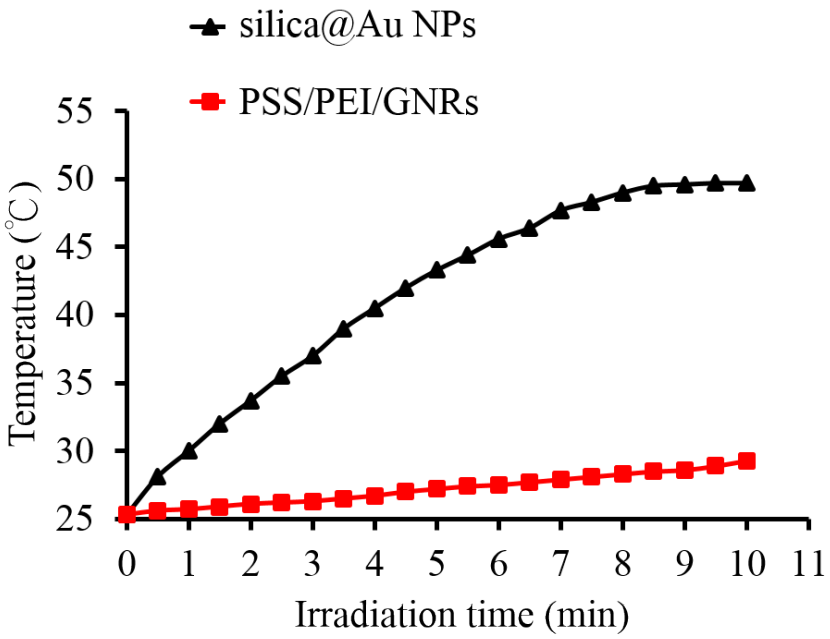

Figure S2. Temperature elevation profiles of PEI/PSS/Au NRs and silica@Au NSs using an 808 nm CW laser power density of 30 W/cm^2 for 10 min. Both nanomaterials have the same particle dosage of 7.8×10^6 particles/μL.

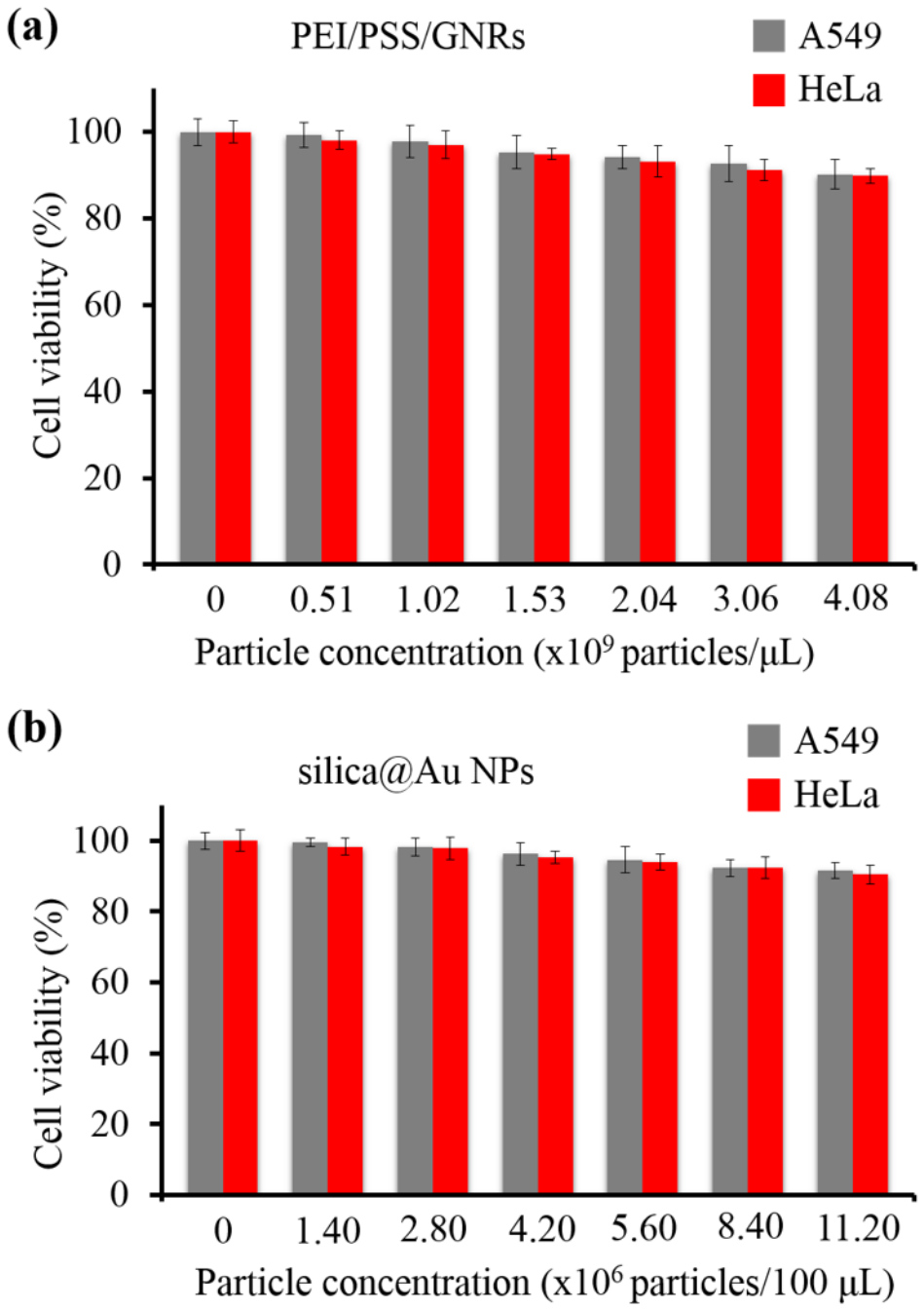

Figure S3. Particle dosage dependent cytotoxicity of (a) PEI/PSS/Au NRs and (b) silica@Au NSs without laser irradiation after incubation with A549 and HeLa cells for 4 h.

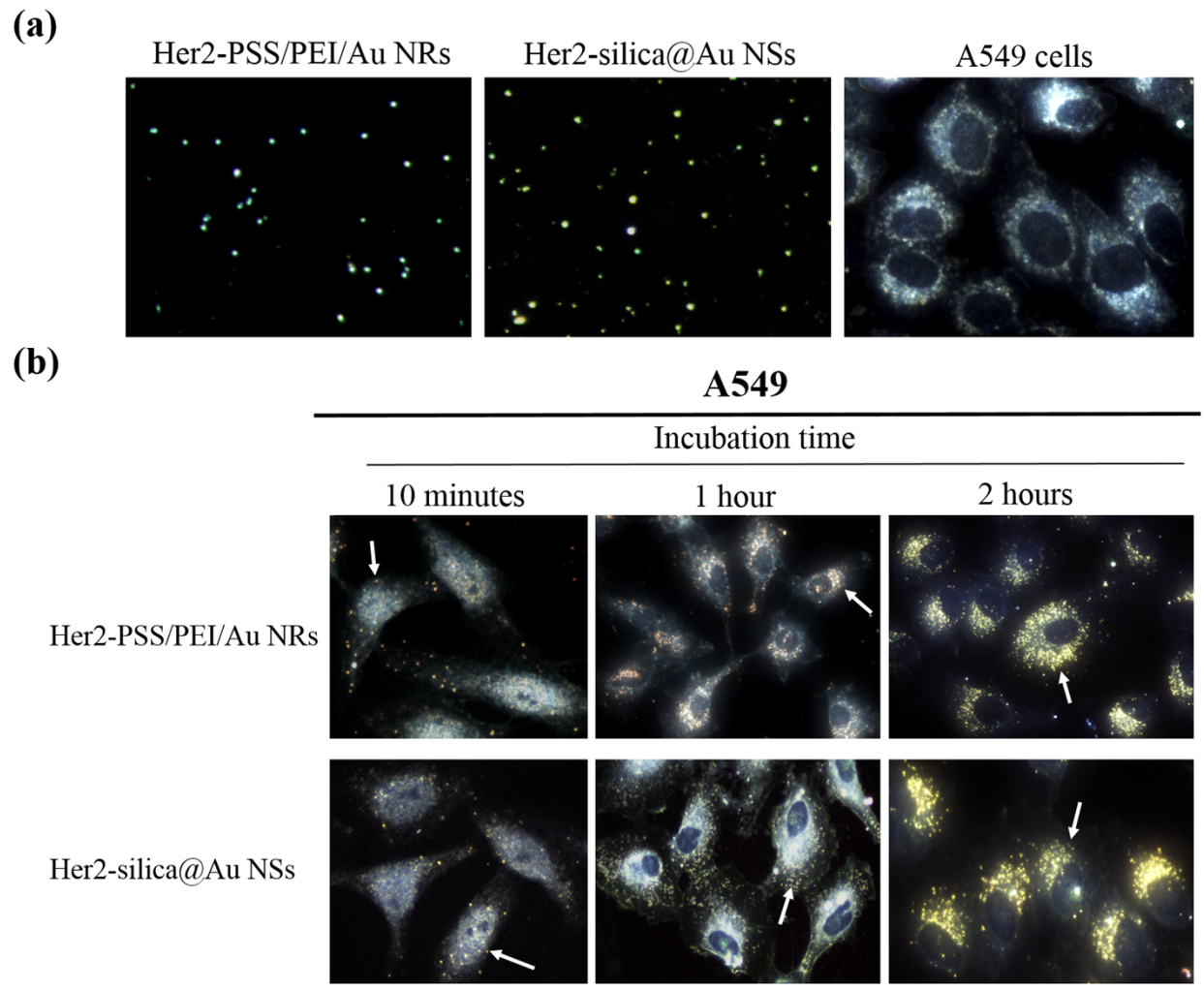

Figure S4. Dark field scattering images of CytoViva microscope. (a) Scattering images of Her2-PSS/PEI/Au NRs, Her-2-silica@Au NSs, and A549 cancer cells. (b) Scattering images of A549 cancer cells respectively incubated with Her2-PSS/PEI/Au NRs (loading particle dosage: 1.12×10^{9} particles/μL) and silica@Au NSs (loading particle dosage: 3.62×10^{6} particles/μL) for 10 minutes, 1 hour, and 2 hours. After incubation, A549 cells were washed twice with PBS. The scattering images of A549 cells were examined using a 40x objective lens (CytoViva microscope). The white arrows indicate the presence of nanoparticles.