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Supporting information

Mesoporous Titania Based Yolk-Shell Nanoparticles as Multifunctional Theranostic Platforms for SERS Imaging and Chemo-Photothermal Treatment

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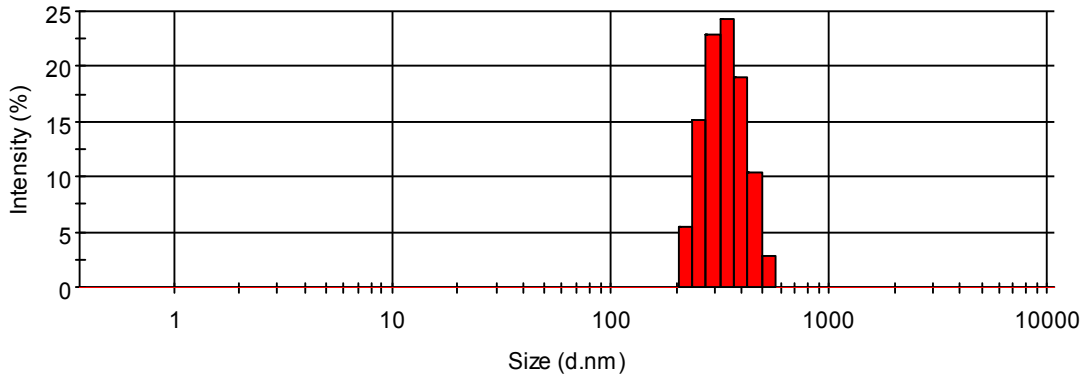

Fig. S1. Dynamic light scattering measurement result of AuNR@void@mTiO$_2$ nanoparticles (NPs) in water. The hydrodynamic diameter of the NPs was in the range of 250 nm to 450 nm.

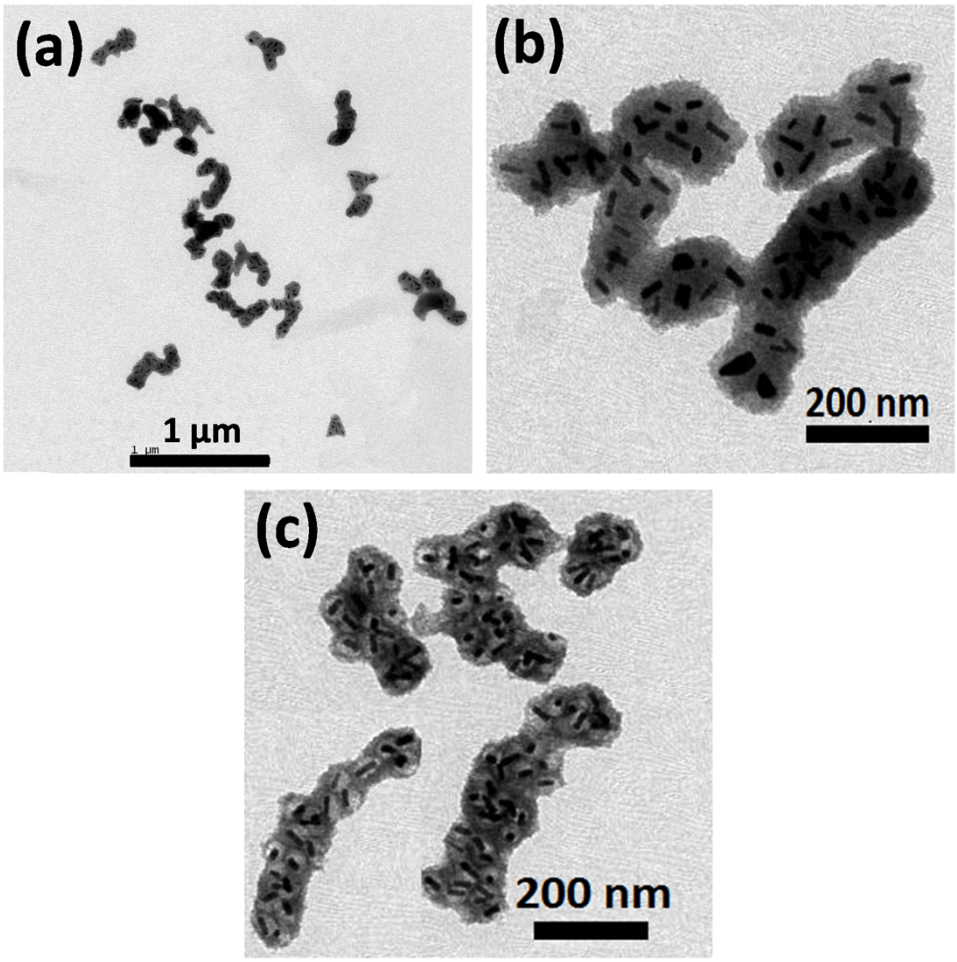

Fig. S2. TEM images of nonuniform worm-like AuNR@mSiO$_2$@mTiO$_2$ NPs (a, b) and the corresponding AuNR@void@mTiO$_2$ yolk-shell NPs.

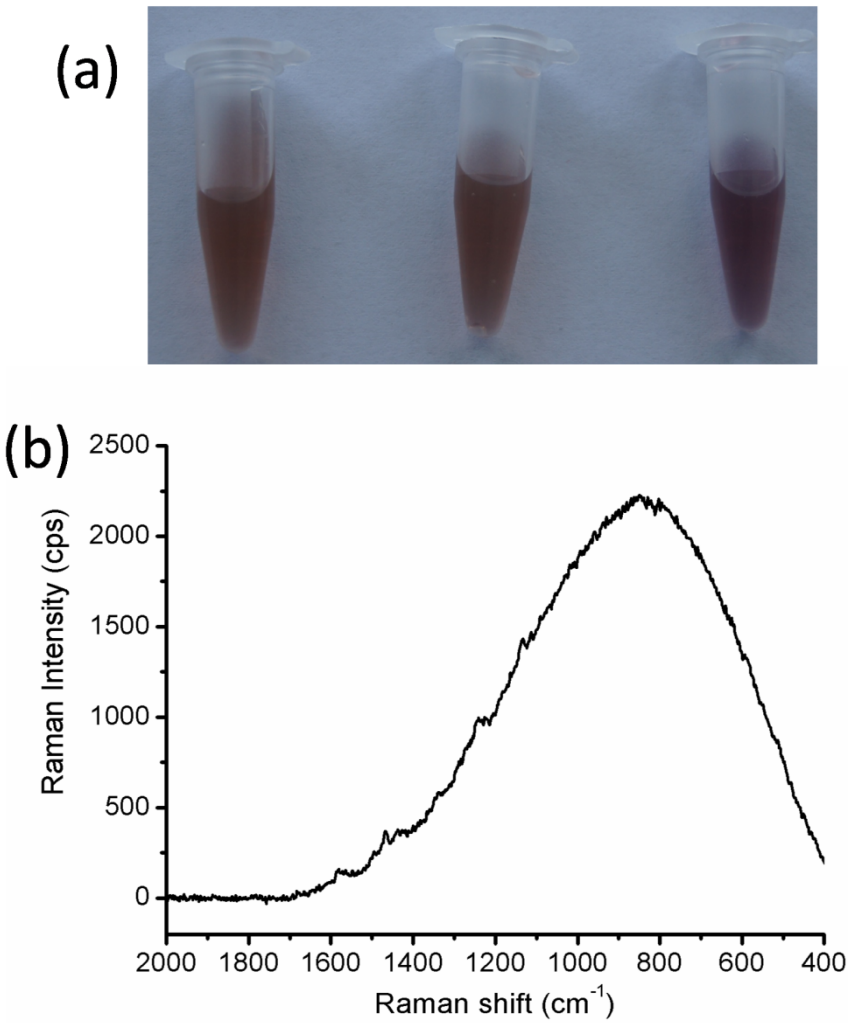

Fig. S3. (a) Digital pictures of pure yolk-shell NP (left), DTDC-labeled NP prepared in pH 2 medium (middle) and in neutral medium (right). The solution color of DTDC-labeled NP prepared in acidic condition was similar with that of pure NP, while the samples prepared in neutral condition showed purple (the color of DTDC solution), indicating a large amount of DTDC adsorbing in $mTiO_2$ shell. (b) The Raman spectrum of the DTDC-labeled NP solution prepared in neutral condition, showing strong fluorescence background. The wavelength of the irradiation laser was 632.8 nm.

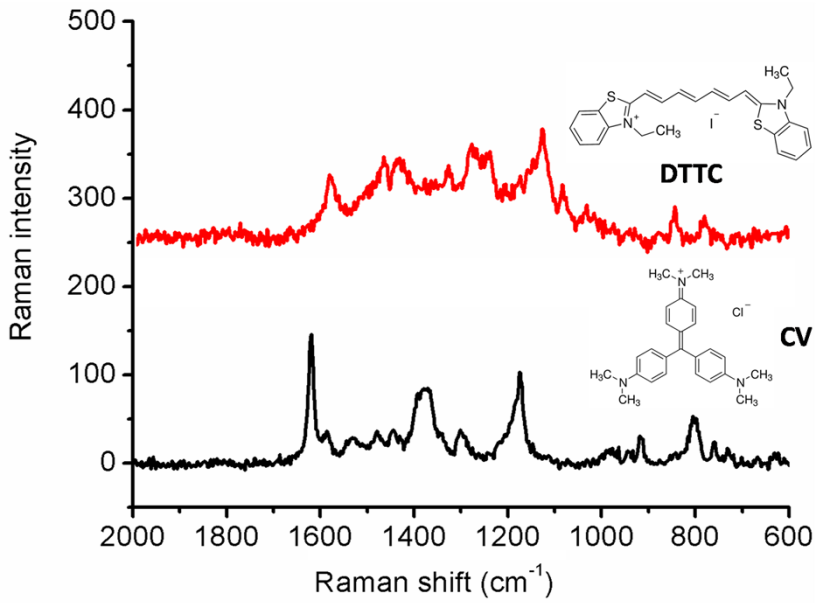

Fig. S4. Raman spectra of the crystal violet and 3,3′-diethylthiatricarbocyanine iodide (DTTC) labeled yolk-shell NPs. The final products exhibited characteristic Raman signature of the corresponding Raman reporter.

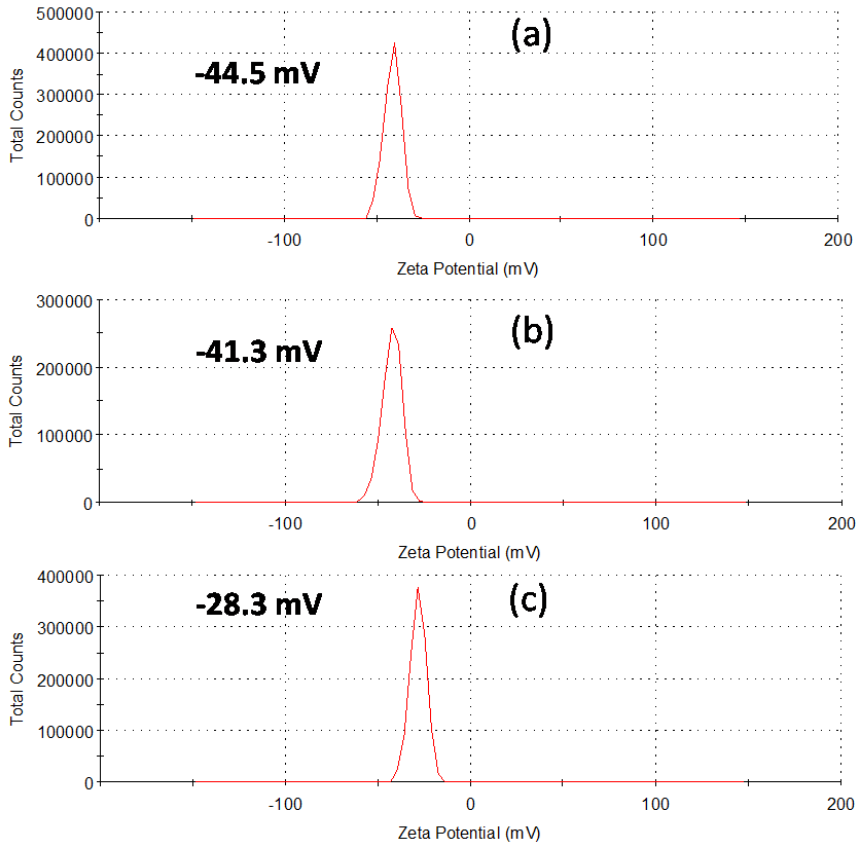

Fig. S5. Zeta potential of AuNR@void@mTiO_2 NPs (a), DTDC labeled NPs (b) and DTDC- DOX co-loaded NPs (c).