Supplementary Information for

Preparation and Photodynamic Therapy Application of $NaYF_4$:Yb,Tm/$NaYF_4$:Yb,Er Multifunctional Upconverting Nanoparticles

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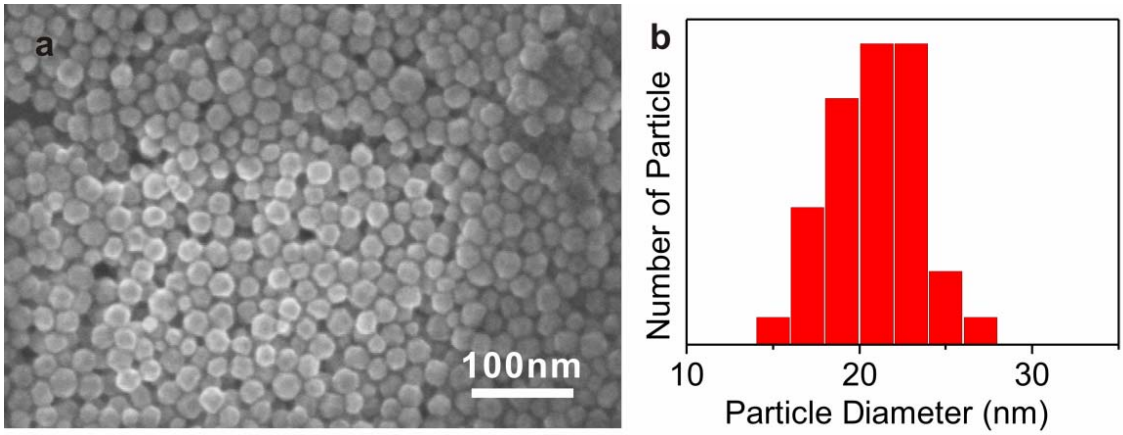

Figure S1. a) SEM images of the $NaYF_4$:Yb^{3+},Tm^{3+}core nanocrystals. b) Histogram of the particle sizes obtained from the SEM images.

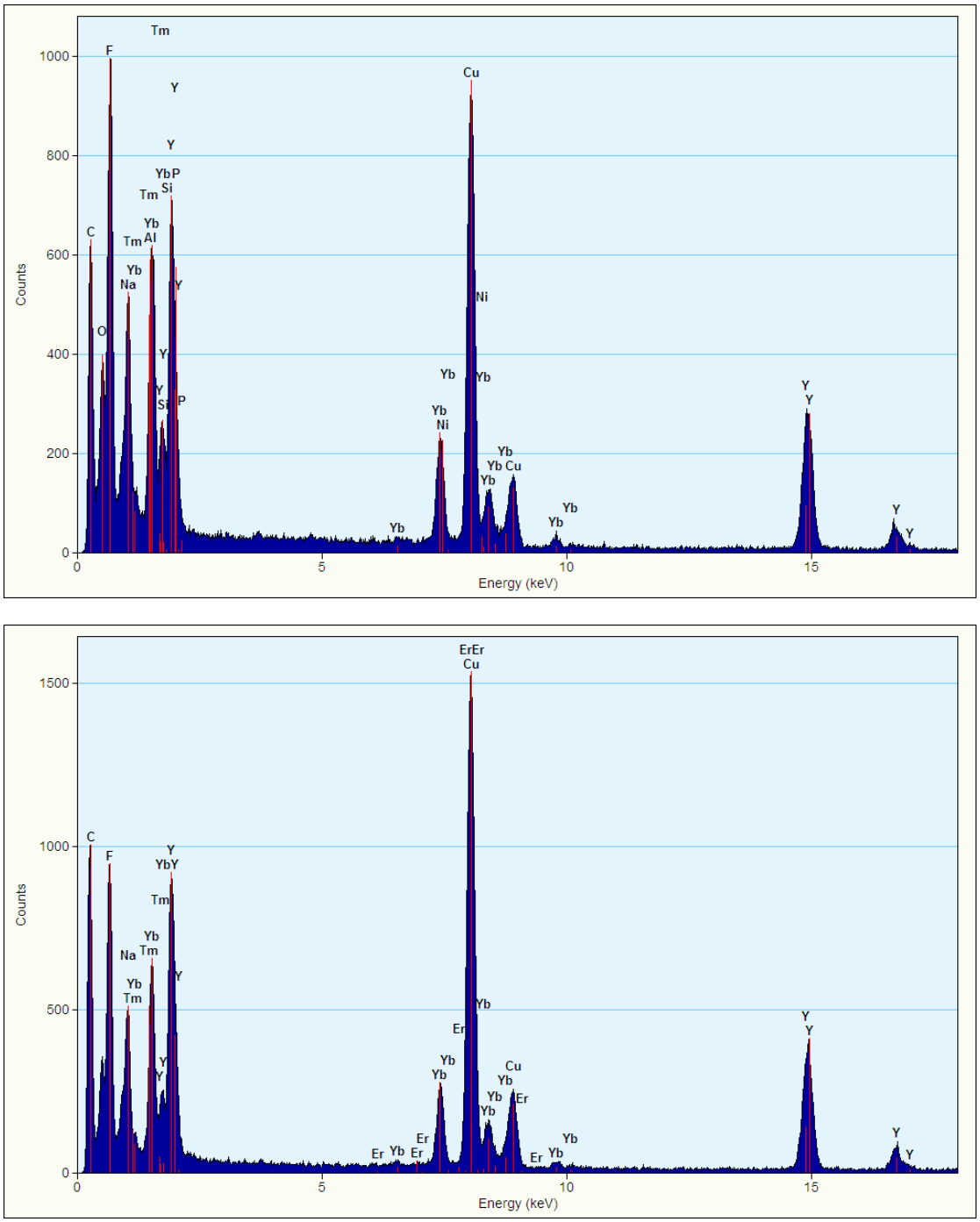

Figure S2. EDX results of the $NaYF_4$:Yb^{3+},Tm^{3+}core (upper) and the $NaYF_4$:Yb^{3+}, Tm^{3+} / $NaYF_4$: Yb^{3+}, Er^{3+} core-shell nanocrystals (UCNPs).

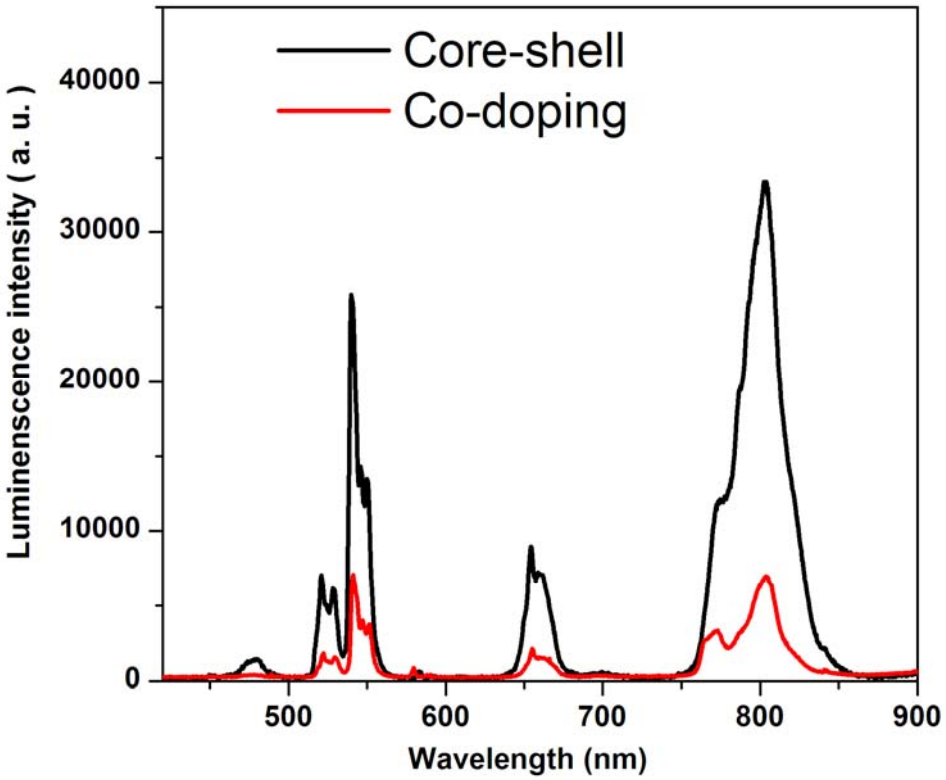

Figure S3. A comparison of the luminescence intensities between the core-shell and co-doped nanoparticles.

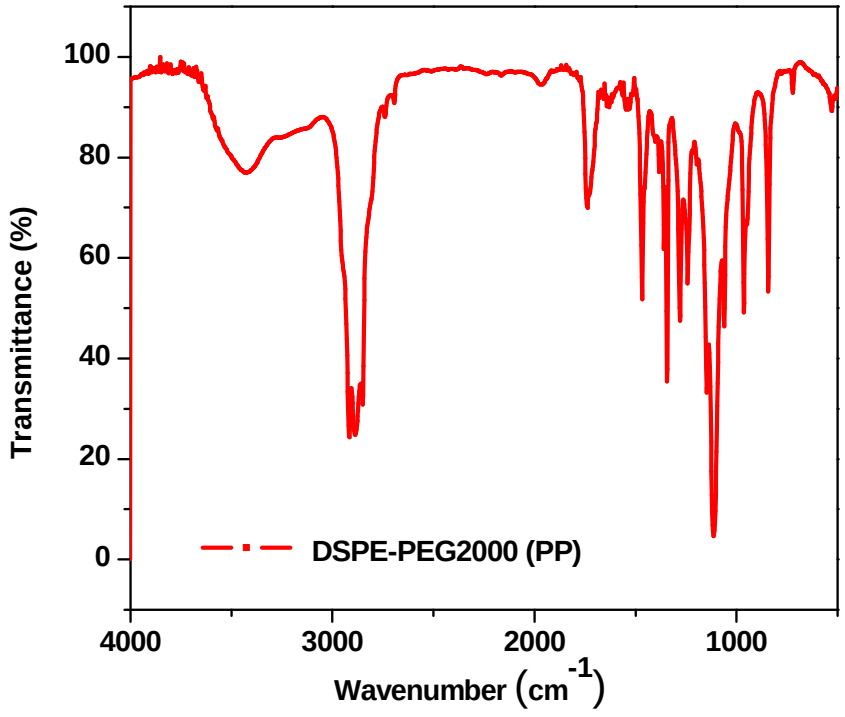

Figure S4. FTIR spectra of DSPE-PEG2000 (PP).

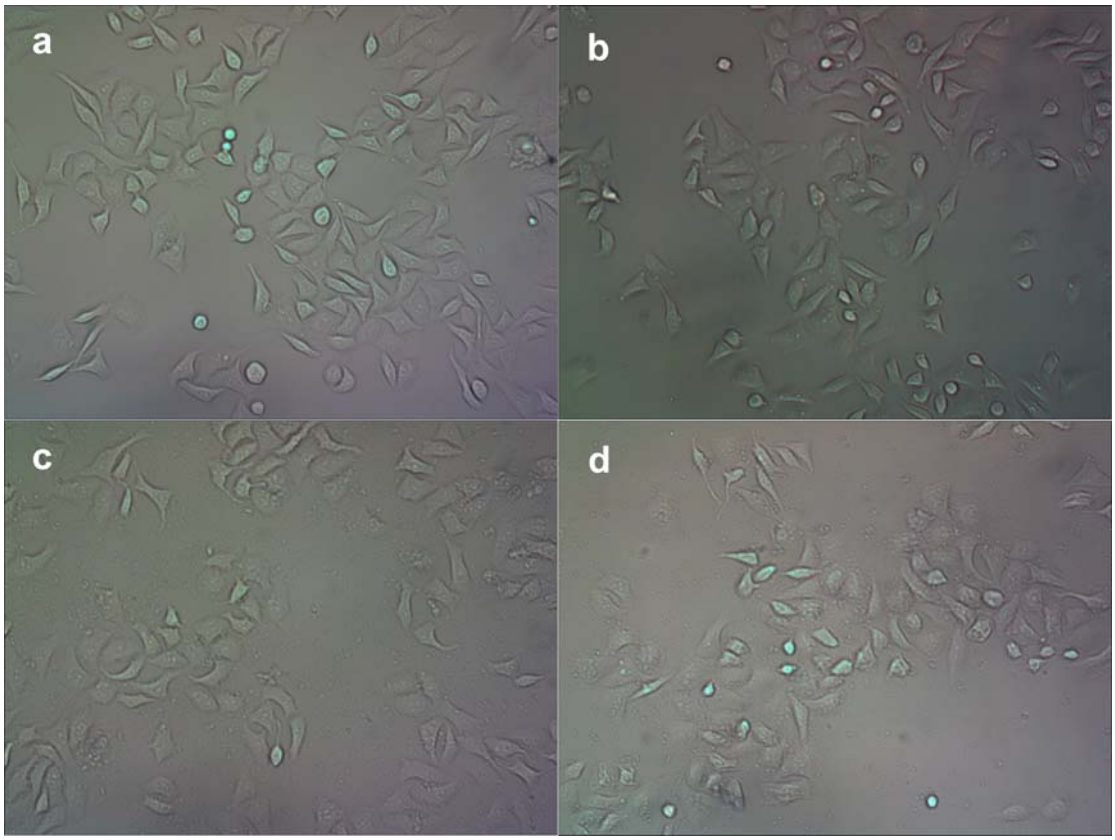

Figure S5. Some control experiments about optical imaging of 7703 liver cancer cells stained with trypan blue. a) without nanoparticles and without light exposure. b) without nanoparticles and with 5 min 980 nm laser exposure. c) with 100 μg/ml UCNP@PP and without light exposure; d) with 100 μg/ml UCNP@PP and 5 min 980 nm laser exposure.