Supplementary Information

Functional up-converting SrTiO$_3$:Er$^{3+}$/Yb$^{3+}$ nanoparticles, structural features, particle size colour tuning and *in vitro* RBC cytotoxicity

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Fig. 1s. Effect of Er$^{3+}$ (upper) and Yb$^{3+}$ (bottom) concentration on crystal structure of the SrTiO$_3$ heated at 600°C.
Fig. 2s. Compare with sample containing 20 mol% of Yb$^{3+}$ heat treated at 600°C with 20 mol% Yb$^{3+}$ sample at 700°C.

Fig. 3s. Note phase separation of the SrTiO$_3$ above 20 mol% of Yb$^{3+}$ at 800°C.
Fig. 4s. Note phase separation of the SrTiO$_3$ with different content of Yb$^{3+}$ above 15 mol% at 900$^\circ$C.

Fig. 5s. Note phase separation of the SrTiO$_3$ with 2 mol% of Er$^{3+}$ and different content of Yb$^{3+}$ samples heated at 900$^\circ$C.
Fig. 6s. Mid-IR spectra of SrTiO$_3$ doped with 5, 10, 15 and 20 % of Yb$^{3+}$ and 0.5 % of Er$^{3+}$ annealed at 800 °C.
Fig. 7. Far-IR spectra of SrTiO$_3$ doped with 5, 10, 15 and 20 % of Yb$^{3+}$ and 0.5 % of Er$^{3+}$ annealed at 800 °C.
Fig. 8s. SEM-EDX analysis of the SrTiO$_3$ 1% Er$^{3+}$/x% Yb$^{3+}$ nanoparticles sintered at 600°C.

Fig. 9s. Calibration curve FIR vs. pump power.
Fig. 10s. Hemolysis assay on human erythrocyte cells loaded with the SrTiO$_3$ 0.5% Er$^{3+}$ / x% Yb$^{3+}$ nanoparticles annealed at 600°C (from left side: negative control (PBS), 1 mg/ml, 0.1 mg/ml, 0.01 mg/ml, positive control (100% hemolysis, distilled water).

Fig. 11s. ESR of human erythrocyte cells loaded with the SrTiO$_3$ 0.5% Er$^{3+}$ / x% Yb$^{3+}$ nanoparticles annealed at 600°C (from left side: negative control (PBS), 1 mg/ml, 0.1 mg/ml, 0.01 mg/ml, positive control (100% hemolysis, distilled water).