## **Supporting Information:**

## Decoration of Up-Converting NaYF4:Yb,Er(Tm) Nanoparticles with Surfactant

## Bilayer. A Versatile Strategy to Perform Oil-to-Water Phase Transfer and

## **Subsequently Surface Silication**

Sen Liang,<sup>*a*</sup> Xue Zhang,<sup>*a*</sup> Zhennan Wu,<sup>*a*</sup> Yi Liu,<sup>*a*</sup> Hao Zhang,<sup>\**a*</sup>, Haizhu Sun,<sup>\**b*</sup> Hongchen Sun<sup>*c*</sup> and Bai Yang<sup>*a*</sup>

<sup>a</sup>State Key Laboratory of Supramolecular Structure and Materials, College of Chemistry, Jilin University, Changchun 130012, P. R. China, <sup>b</sup>College of Chemistry, Northeast Normal University, Changchun 130024, P. R. China, and <sup>c</sup>School of Stomatology, Jilin University, Changchun, 130041, P. R. China.

**Figure S1.** TEM image of PPy-capped NaYF<sub>4</sub>:Yb,Er UCNPs. The average diameter of the UCNPs was 35 nm.



**Figure S2.** UV-vis absorption spectrum of  $NaYF_4$ :Yb,Er(Tm) UCNPs. A Yb<sup>3+</sup> absorption peak at 976 nm was observed.



**Figure S3.** Schematic illustration of the transition energy levels of NaYF<sub>4</sub>:Yb,Er and NaYF<sub>4</sub>:Yb,Tm UCNPs.



**Table S1.** Zeta potentials  $\zeta$  of the aqueous solution of CTAB, DTAB, SDS, and C<sub>8</sub>PhE<sub>10</sub>, which were measured at room temperature.

surfactants	CTAB	DTAB	SDS	$C_8PhE_{10}$
ζ/mV	+43.5	+36.6	-40.5	-2.1

**Figure S4.** TEM image of SiO<sub>2</sub>-capped NaYF<sub>4</sub>:Yb,Er UCNPs. The amount of TEOS was 1.2 g, whereas other experimental variables were similar with the sample in Figure 6b. The average diameter of the UCNPs was 30 nm.

