

## Supporting Information

### Upconversion nanoparticles modified by Cu<sub>2</sub>S for photothermal therapy along with a real-time optical thermometry

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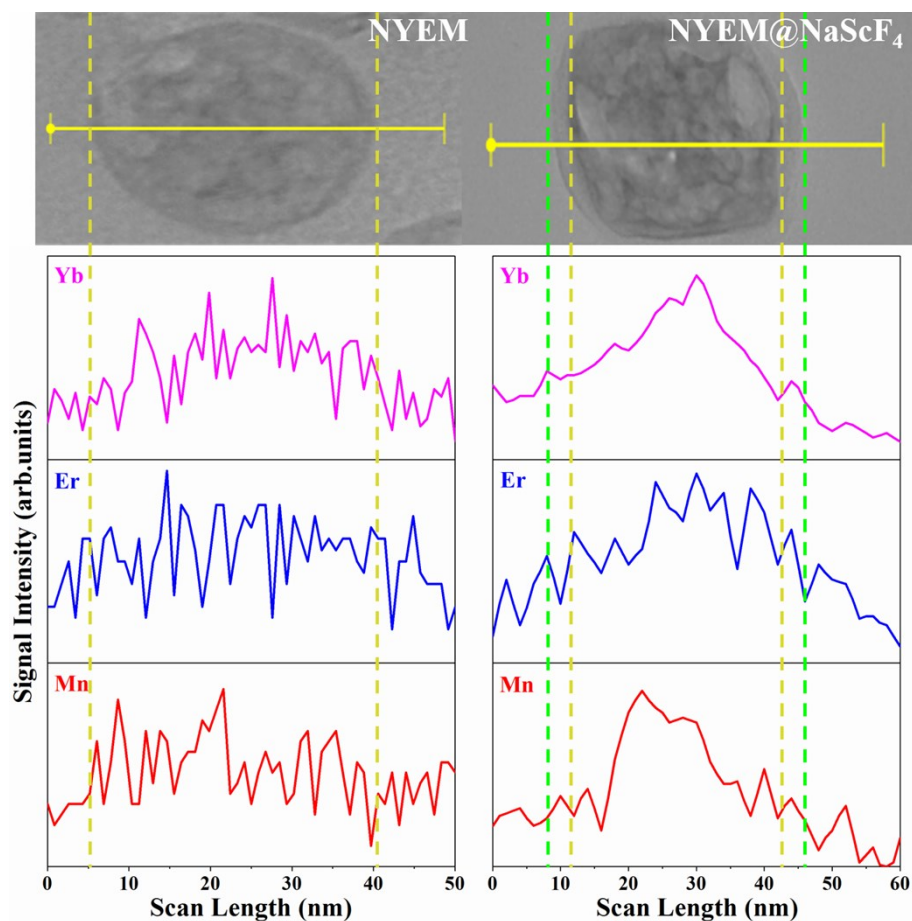


Figure S1 EDS line scan of NYEM and NYEM@NaScF<sub>4</sub>.

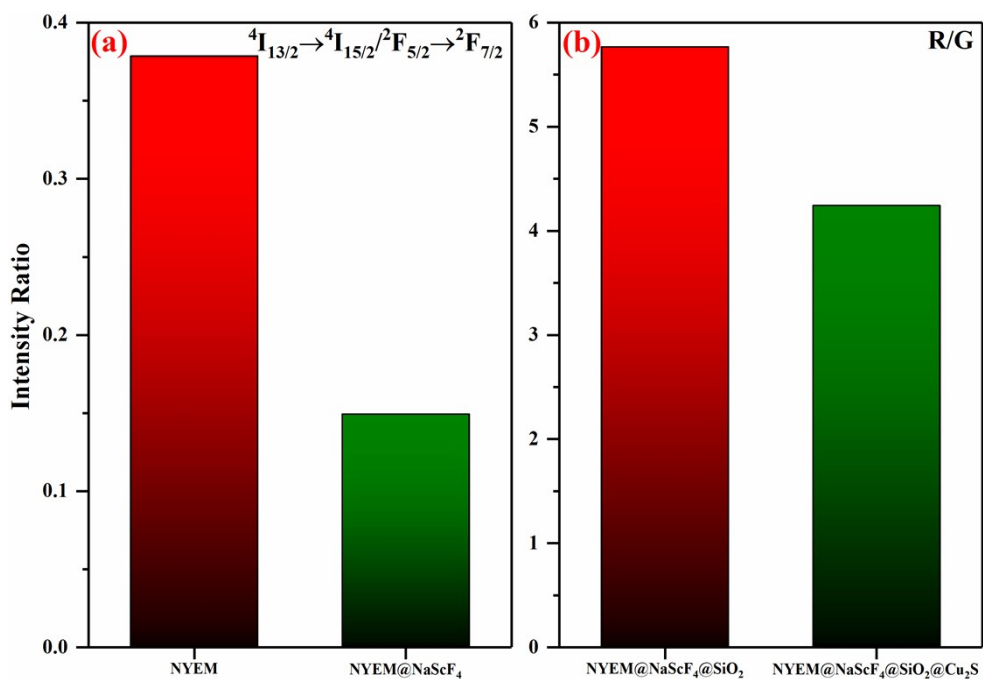


Figure S2 (a) The intensity ratio of Er<sup>3+</sup>:  $^4I_{13/2} \rightarrow ^4I_{15/2}$  transition to Yb<sup>3+</sup>:  $^2F_{5/2} \rightarrow ^2F_{7/2}$  transition of NYEM and NYEM@NaScF<sub>4</sub>. (b) The R/G of NYEM@NaScF<sub>4</sub>@SiO<sub>2</sub> and NYEM@NaScF<sub>4</sub>@SiO<sub>2</sub>@Cu<sub>2</sub>S.

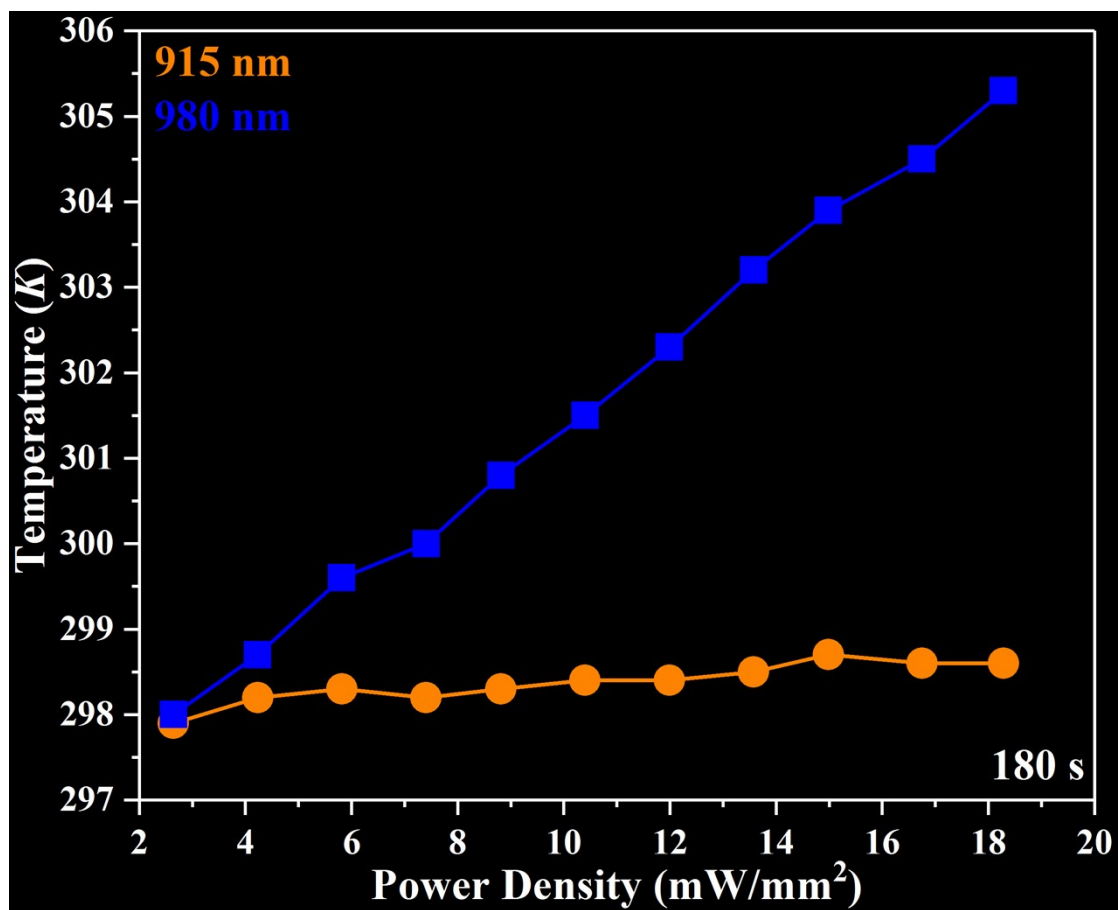


Figure S3 Temperature of blank PBS solution versus power density.