

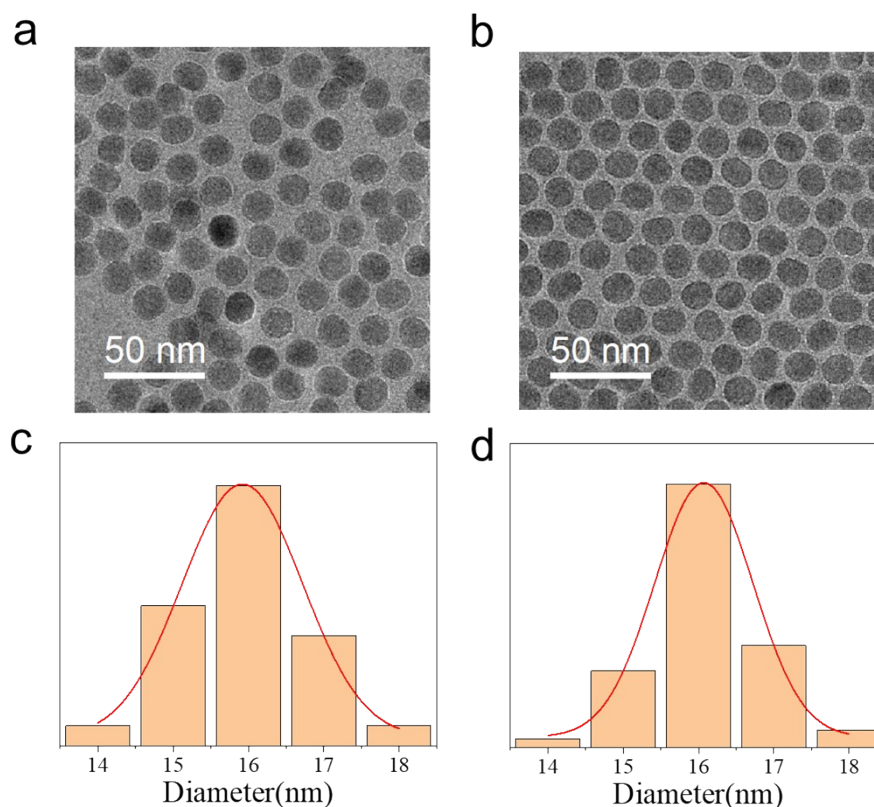
## Supplementary Information

### Unveiling the Mechanism Behind Shell Thickness-Dependent X-Ray Excited Optical and Persistent Luminescence in Lanthanide-Doped Core/Shell Nanoparticles

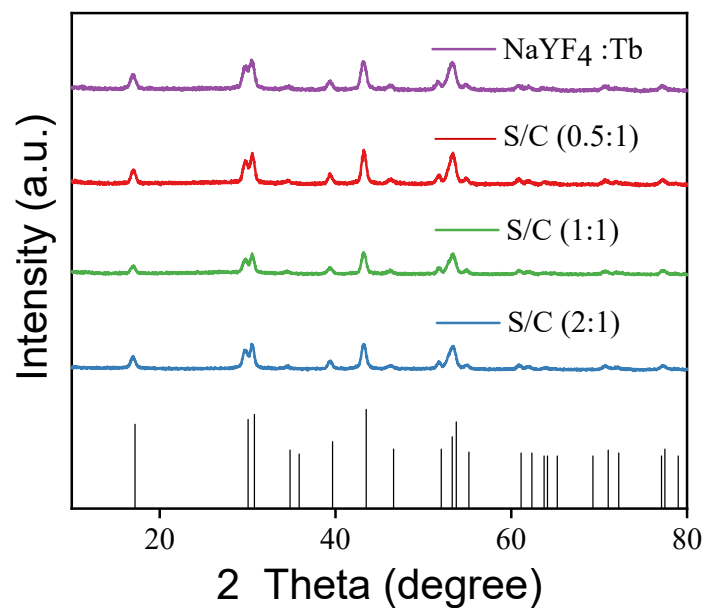
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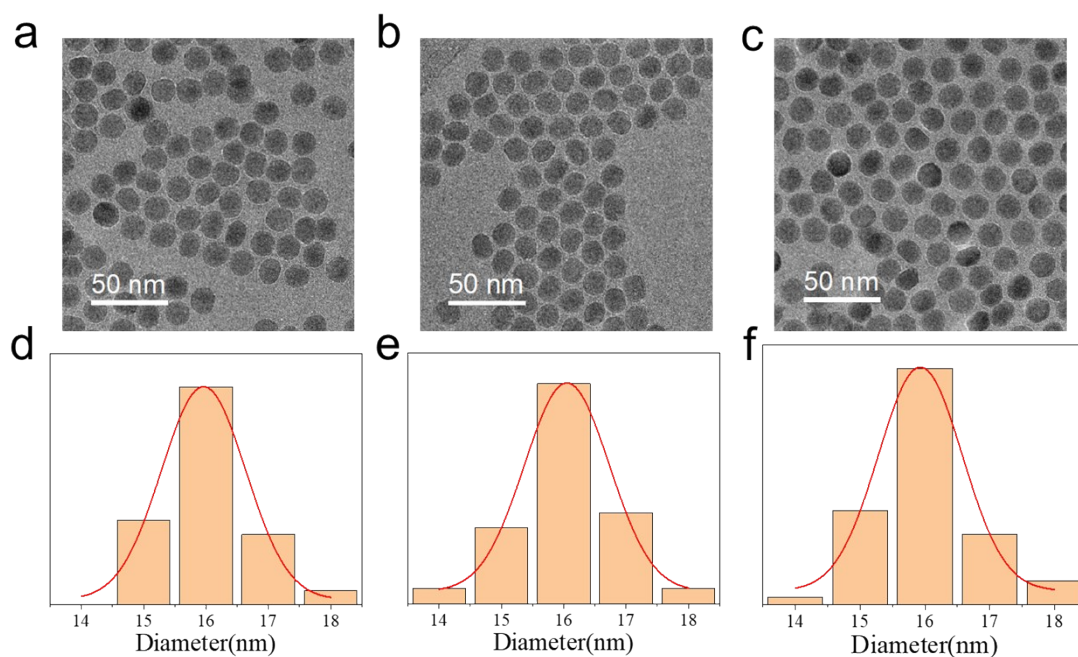
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**Fig. S1** (a) TEM image of the first batch of NaYF<sub>4</sub>: Tb NPs. (b) TEM image of the second batch of NaYF<sub>4</sub>: Tb NPs. (c) histogram of size distributions of the first batch of NaYF<sub>4</sub>: Tb NPs. (d) histogram of size distributions of the second batch of NaYF<sub>4</sub>: Tb NPs.



**Fig. S2** XRD patterns of the NaYF<sub>4</sub>: Tb@NaYF<sub>4</sub> NPs prepared with different S/C ratio.



**Fig. S3** (a) TEM image of the first batch of NaYF<sub>4</sub>: Tb NPs. (b) TEM image of the second batch of NaYF<sub>4</sub>: Tb NPs. (c) TEM image of the third batch of NaYF<sub>4</sub>: Tb NPs. (d) histogram of size distributions of the first batch of NaYF<sub>4</sub>: Tb NPs. (e) histogram of size distributions of the second batch of NaYF<sub>4</sub>: Tb NPs. (f) histogram of size distributions of the third batch of NaYF<sub>4</sub>: Tb NPs.