

## **Electronic supporting Information**

### **Methylene Blue loaded Upconverting Hydrogel Nanocomposite: Potential material for Near-Infrared Light-Triggered Photodynamic Therapy Application**

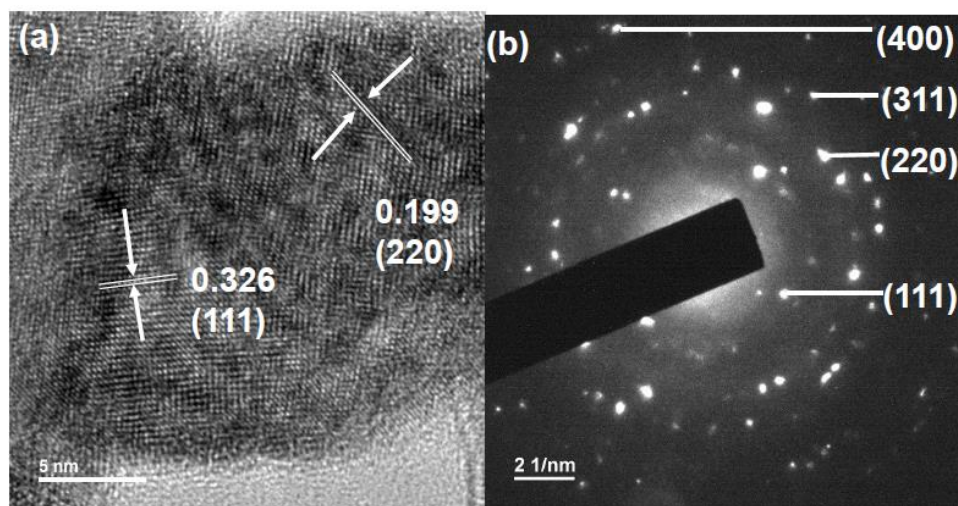
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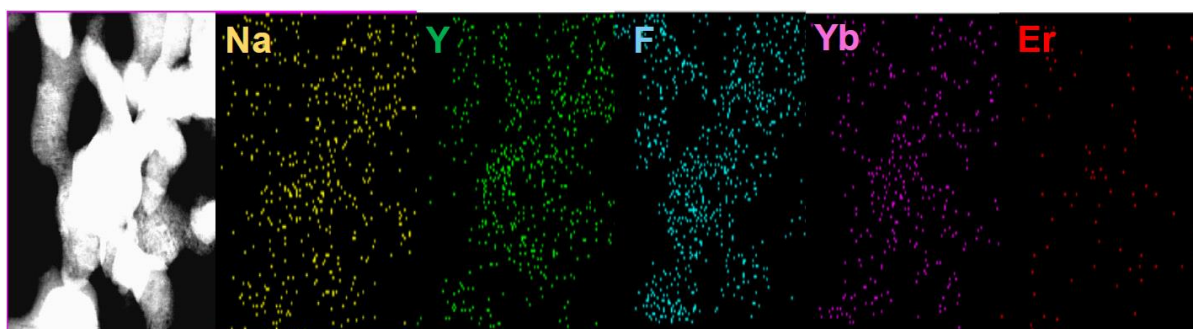
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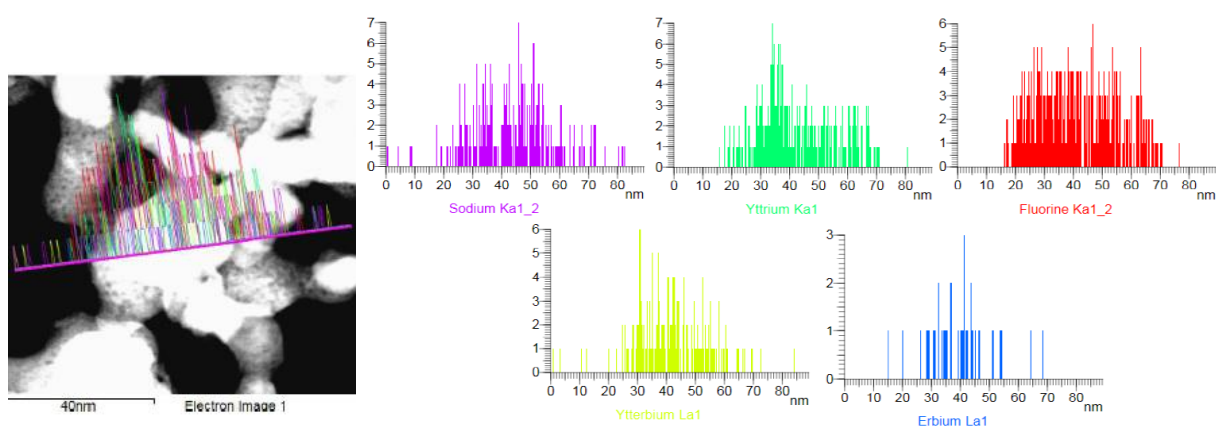
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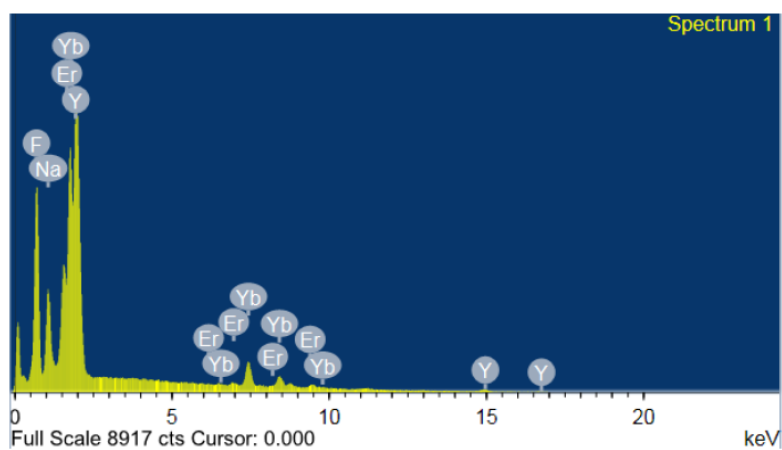
**Figure S1.** (a) HRTEM image of 10-UDA capped  $\text{Yb}^{3+}/\text{Er}^{3+}$ -doped  $\text{NaYF}_4$  NPs. (b) SAED pattern of 10-UDA capped  $\text{Yb}^{3+}/\text{Er}^{3+}$ -doped  $\text{NaYF}_4$  NPs.



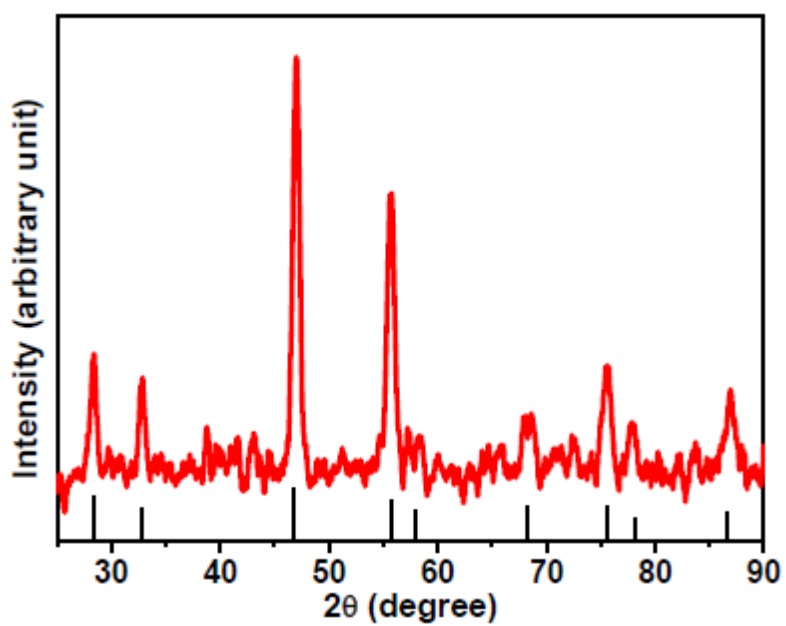
**Figure S2.** Elemental mapping of 10-UDA capped  $\text{Yb}^{3+}/\text{Er}^{3+}$ -doped  $\text{NaYF}_4$  NPs.



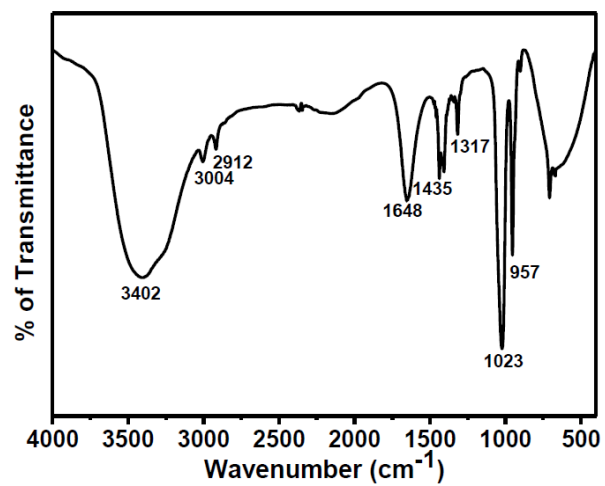
**Figure S3.** Line scanning of 10-UDA capped  $\text{Yb}^{3+}/\text{Er}^{3+}$ -doped  $\text{NaYF}_4$  NPs.



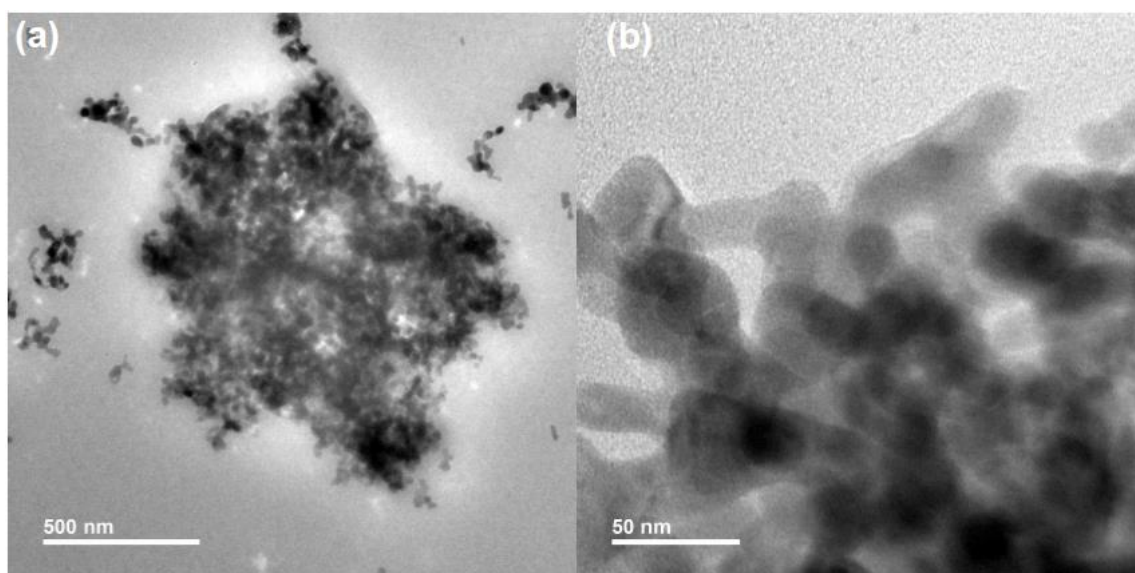
**Figure S4.** EDX Spectrum of 10-UDA capped  $\text{Yb}^{3+}/\text{Er}^{3+}$ -doped  $\text{NaYF}_4$  NPs.



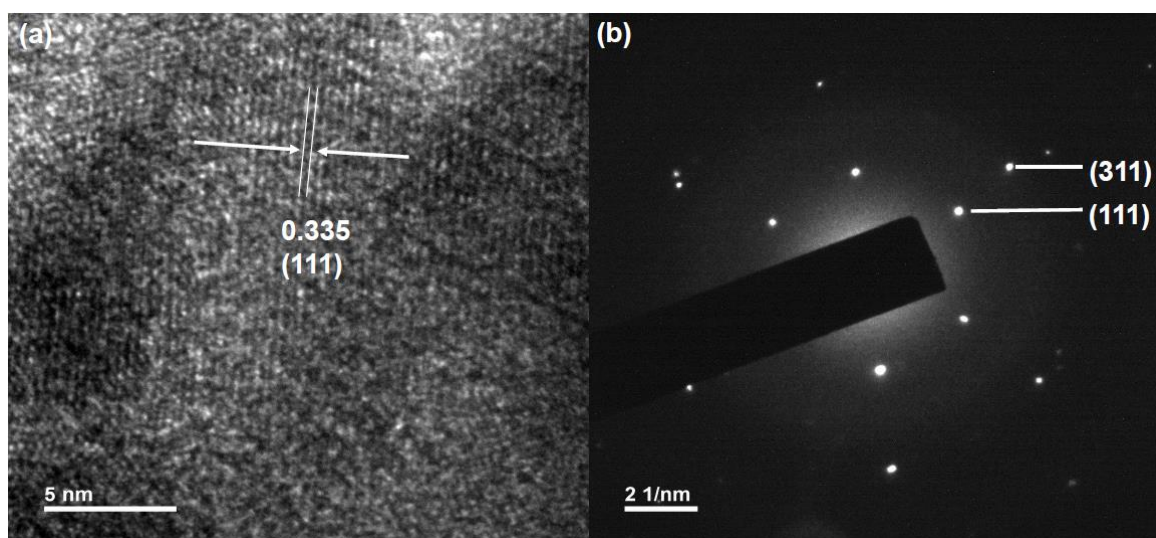
**Figure S5.** PXRD pattern of the nanocomposite gel (NIPAM-MBA@10-UDA- $\text{NaYF}_4:\text{Yb}^{3+}/\text{Er}^{3+}$ ).



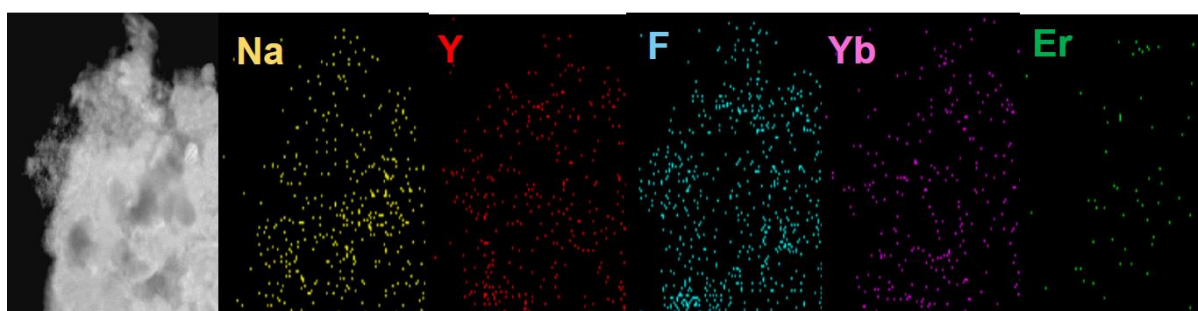
**Figure S6.** FTIR spectrum of the nanocomposite gel (NIPAM-MBA-@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup>).



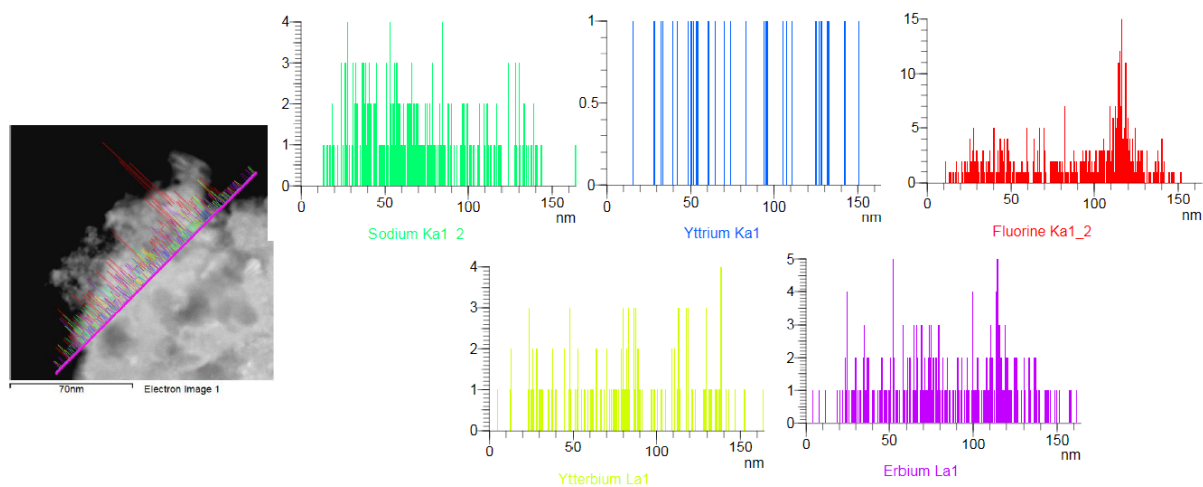
**Figure S7.** TEM images of NIPAM-MBA@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup> hydrogel composite (a) low magnification and (b) high magnification.



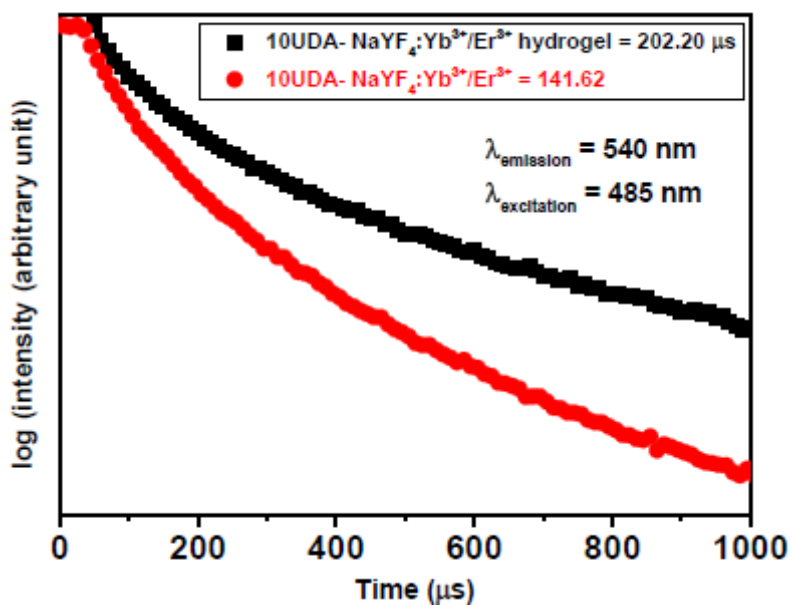
**Figure S8.** (a) HRTEM image of NIPAM-MBA@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup> hydrogel composite (b) SAED pattern of NIPAM-MBA@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup> hydrogel composite.



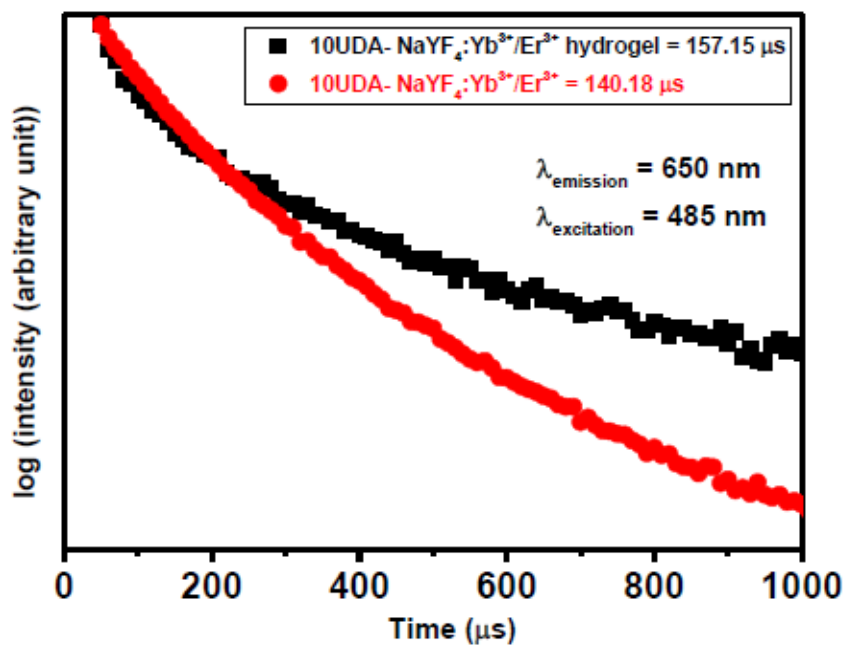
**Figure S9.** Elemental mapping of NIPAM-MBA@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup> hydrogel composite.



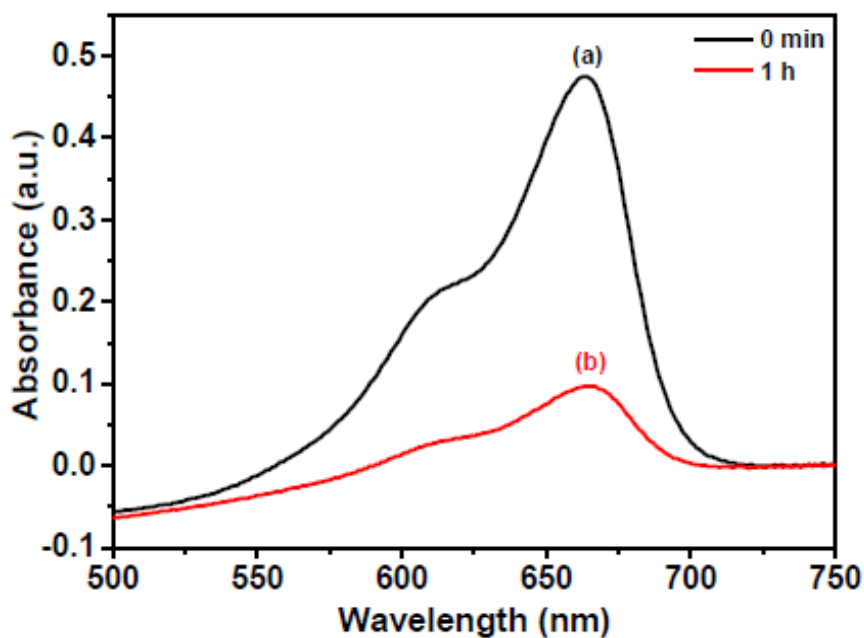
**Figure S10.** Line scanning of NIPAM-MBA@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup> hydrogel composite.



**Figure S11.** Lifetime decay curve of Er<sup>3+</sup>, <sup>4</sup>S<sub>3/2</sub> energy state obtained using direct excitation at 485 nm.



**Figure S12.** Lifetime decay curve of Er<sup>3+</sup>, <sup>4</sup>F<sub>9/2</sub> energy state obtained using direct excitation at 485 nm.



**Figure S13.** UV-Visible absorption spectra of MB loaded hydrogel composite supernatant (NIPAM-MBA@10-UDA-NaYF<sub>4</sub>:Yb<sup>3+</sup>/Er<sup>3+</sup>) measured at (a) 0 minute and (b) after 1 h.