

## POLYMER ENCAPSULATED UPCONVERTING NANOPARTICLES FOR CELL IMAGING

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### **Abstract**

NaYF<sub>4</sub>-based upconverting nanoparticles (UCNPs) have recently emerged as promising nanomaterials for in vitro and in vivo bio-labelling and optical fluorescence imaging. UCNPs obtained by high-temperature decomposition methods are generally not dispersible in aqueous solutions and therefore, surface modification is crucial for further biological applications. Here we report a transfer of hydrophobic - NaYF<sub>4</sub>:Er<sup>3+</sup>, Yb<sup>3+</sup> UCNPs into water using amphiphilic hyaluronic acid. In aqueous media, oleyl-hyaluronic acid derivative could self-assemble into micelle-like structures into which oleate-capped -NaYF<sub>4</sub>:Er<sup>3+</sup>, Yb<sup>3+</sup> were incorporated via microemulsion method. Finally, a shell of these polymeric micelles was chemically cross-linked using bifunctional agent to ensure good separation of nanoparticles from the surrounding media. We demonstrated the uptake of encapsulated -NaYF<sub>4</sub>:Er<sup>3+</sup>, Yb<sup>3+</sup> by NHDF (Normal Human Dermal Fibroblasts) and MDA-MB 231 (human breast adenocarcinoma) cell lines, showing the utility of - NaYF<sub>4</sub>:Er<sup>3+</sup>, Yb<sup>3+</sup> UCNPs as bio-labels.

**Keywords:** Upconverting nanoparticles, hyaluronic acid, polymeric micelle, cell imaging

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