

## SYNTHESIS OF UPCONVERTING CORE-SHELL NANOPARTICLES

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### Abstract

Lanthanide doped upconverting nanoparticles have been known as powerful tools for bioimaging because of their excellent signal to noise ratio and extended imaging depth. Their light emission efficiency depends on their crystal structure, their size and interaction with surrounding environment (liquid media). Shells produced from the undoped lanthanide material and deposited on the surface of the upconverting core nanocrystals form a mechanical barrier, which protects the light emitting core from a direct contact with the surrounding environment reducing the number of their mutual interactions and increasing the intensity of the emitted visible light. Upconverting NaREF<sub>4</sub>:Yb/Er@NaREF<sub>4</sub> core-shell nanoparticles (RE = Y, Gd) were prepared by two synthetic approaches. Recrystallisation of sacrificial nanoparticles at high temperature and their deposit in the form of a layer on the surface of core nanocrystals produced core-shell nanoparticles with irregular shell coverage, while repeated addition of small portions of a RE-oleates solution to core nanocrystals ripening at high temperatures resulted in formation of a regular shell layer covering the whole core nanocrystal.

**Keywords:** Nanoparticles, upconversion, core, shell, synthesis

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