

Supplementary Information for:

Characterization of the optical, electronic and magnetic properties of multifunctional β -NaEuF₄/NaGdF₄ core-shell nanoparticles with narrow size distribution

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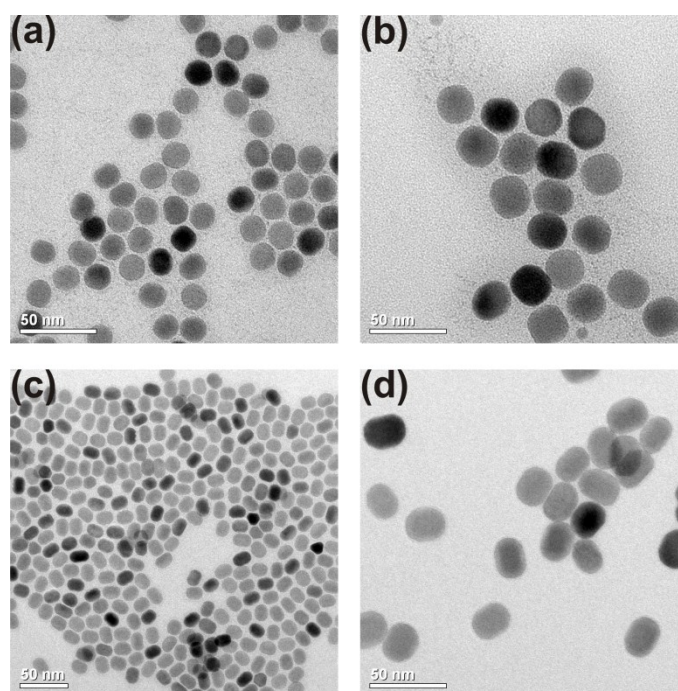


Figure S 1: TEM images of (a) 20 nm β -NaEuF₄/NaGdF₄ core-shell nanoparticles with 3 nm β -NaEuF₄ core, (b) 22 nm β -NaGdF₄ nanoparticles doped with 1% Eu, (c) pure 18 nm NaEuF₄ nanoparticles and (d) 22 nm β -NaEuF₄/NaGdF₄ core-shell nanoparticles with 18 nm β -NaEuF₄ core.

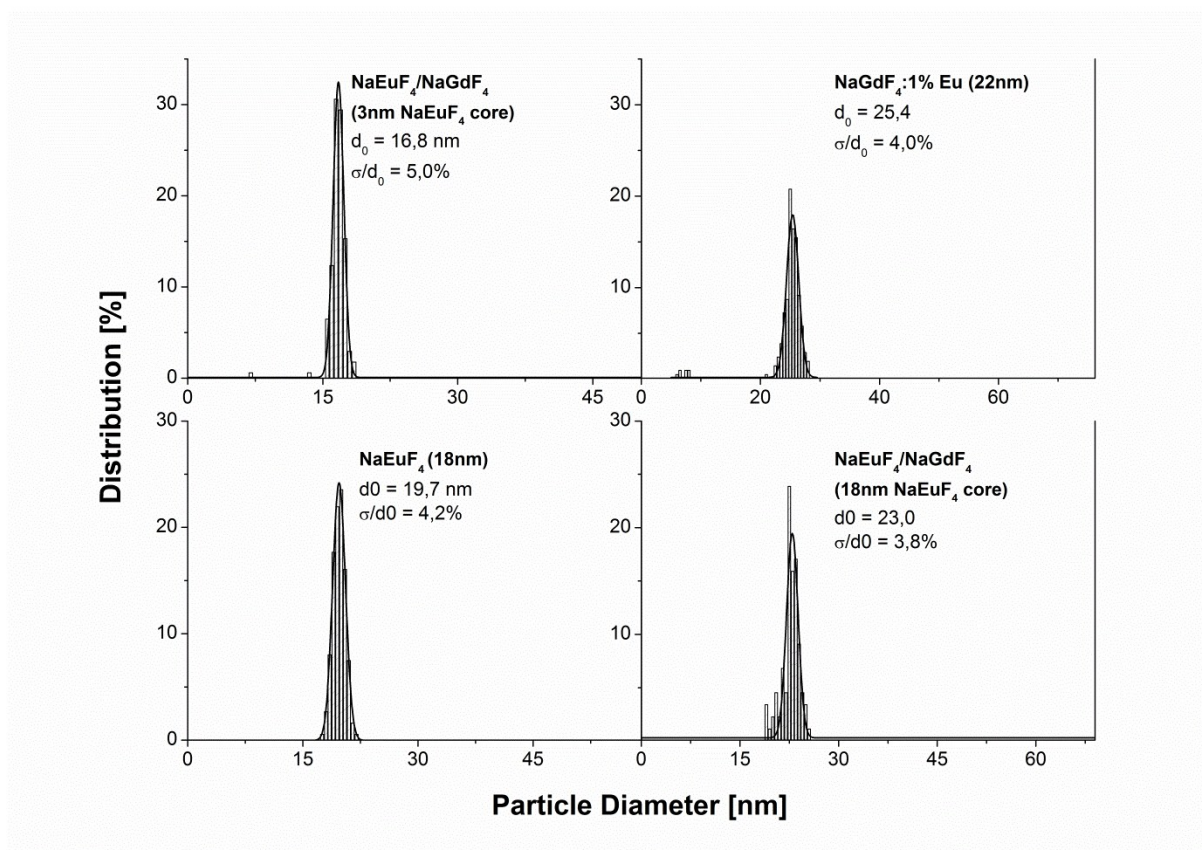


Figure S 2: Size histograms of β -NaEuF₄/NaGdF₄ core-shell nanoparticles, β -NaGdF₄ nanoparticles doped with 1% Eu and pure NaEuF₄ nanoparticles.

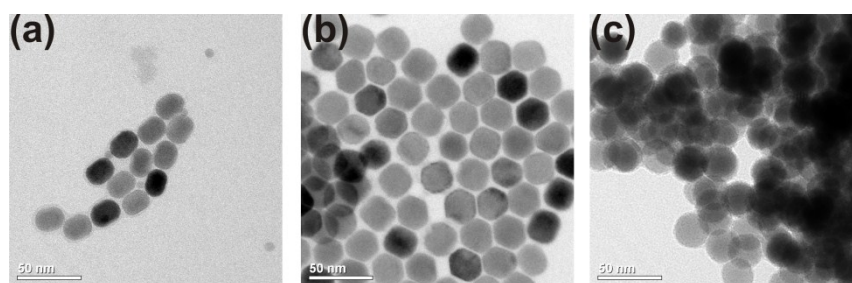


Figure S 3: TEM images of (a) 20 nm β -NaGdF₄/NaEuF₄ core-shell nanoparticles with 3 nm β -NaGdF₄ core, (b) 22 nm β -NaEuF₄ nanoparticles doped with 1% Gd and (c) pure 22 nm NaEuF₄ nanoparticles.

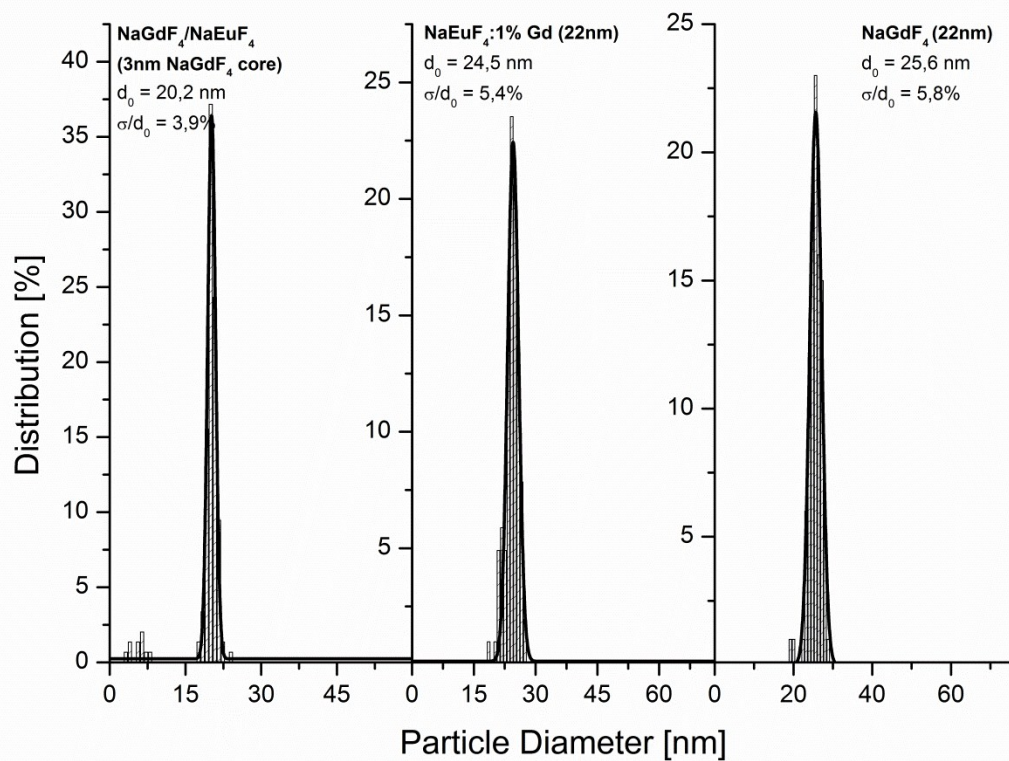


Figure S 4: Size histograms of β -NaGdF₄/NaEuF₄ core-shell nanoparticles, β -NaEuF₄ nanoparticles doped with 1% Gd and pure NaGdF₄ nanoparticles.

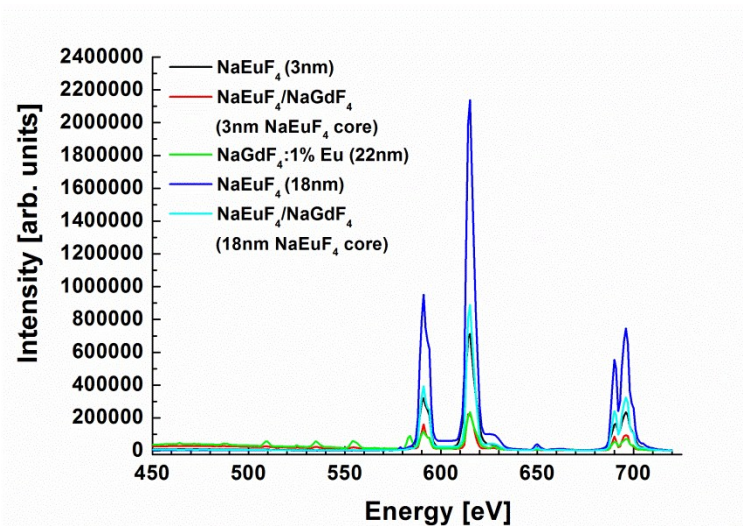


Figure S 2: Emission spectra of 3 nm β -NaEuF₄, 20 nm β -NaEuF₄/NaGdF₄ NPs with a 3 nm core, 22 nm β -NaGdF₄ NP doped with 1% Eu, 18 nm β -NaEuF₄ and 22 nm β -NaEuF₄/NaGdF₄ NPs with a 18 nm β -NaEuF₄ core. The spectra were recorded under 394 nm excitation of the Eu³⁺ ions.

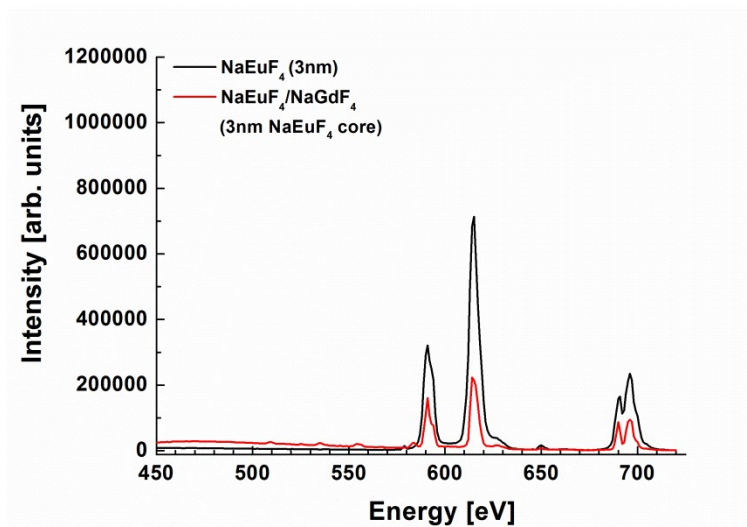


Figure S 3: Emission spectra of 3 nm β -NaEuF₄ and 20 nm β -NaEuF₄/NaGdF₄ NPs with 3 nm β -NaEuF₄ core.

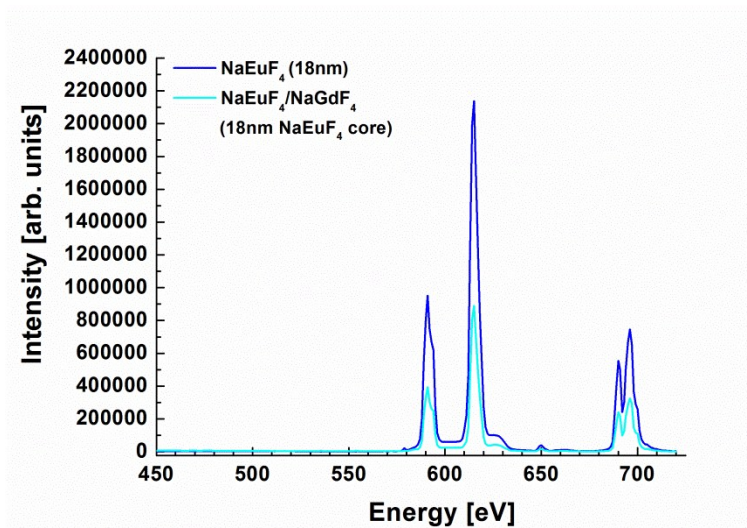


Figure S 4: Emission spectra of 18 nm β -NaEuF₄ and 22 nm β -NaEuF₄/NaGdF₄ NPs with 18 nm β -NaEuF₄ core.