

Supporting Information

Luminescence Properties of α -NaYF₄:Nd³⁺ Nanocrystals Dispersed in Liquid: Local Field Effect Investigation

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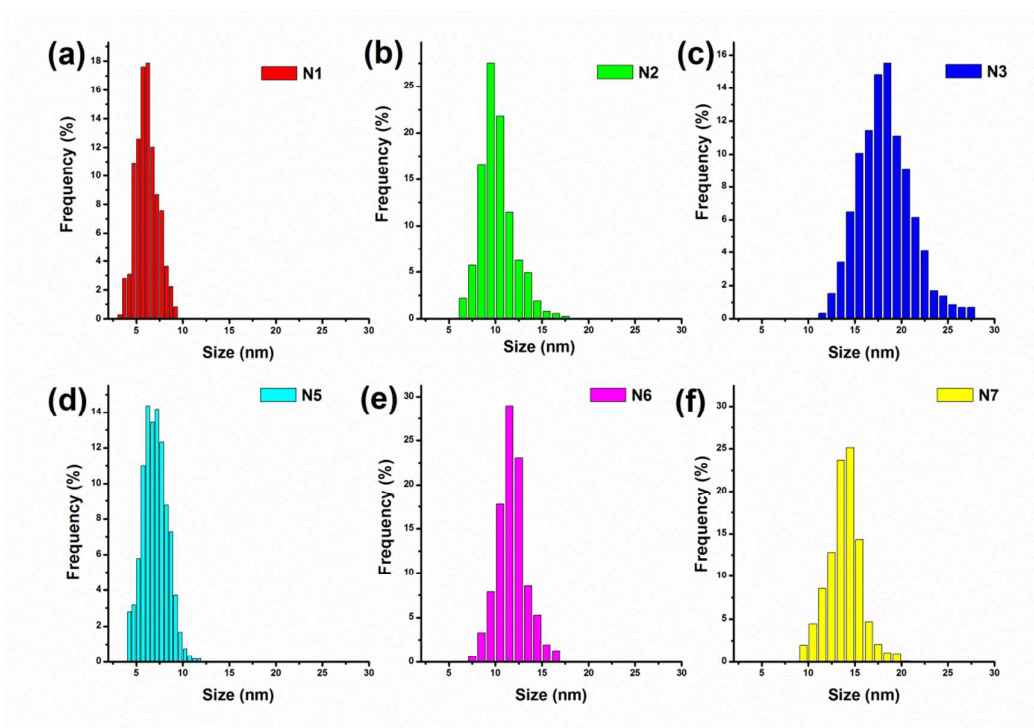


Figure S1. Histograms of the particle sizes for α -NaYF₄:1% Nd³⁺ nanocrystals synthesized with the F⁻/Ln³⁺ molar ratio of (a) 3:1, (b) 4:1, and (c) 5:1 with 0.2 g NaOH and (d) 3:1, (e) 4:1, and (f) 5:1 with 0.4 g NaOH. These data were obtained from the TEM images of more than 400 nanocrystals. By Gauss fitting the average size was obtained to be (a) 6.0±1.3 nm, (b) 10.6±1.6 nm, (c) 18.3±3.0 nm, (d) 7.0±1.6 nm, (e) 11.7±1.9 nm, and (f) 14.0±1.7 nm.

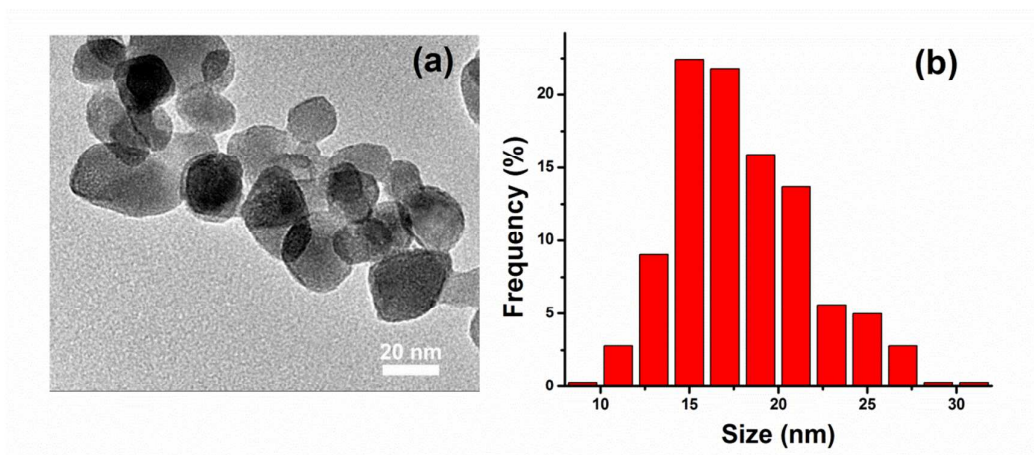


Figure S2. (a) The TEM image of α -NaYF₄:5% Nd³⁺ nanocrystals (sample N10) and (b) the corresponding histograms of the particle sizes for counting more than 200 particles. By Gauss fitting the average size was calculated to be 17.1 ± 3.9 nm.

Table S1. Detailed emission lifetimes and the corresponding weight factor^a of α -NaYF₄ nanocrystals with different size and Nd³⁺ concentration.

Sample	Size	WF ₁	τ_1 (μ s)	WF ₂	τ_2 (μ s)	WF ₃	τ_3 (μ s)
N3 (1% Nd ³⁺)	18nm	0.294	1106	0.597	409.48	0.109	106.51
N10 (5% Nd ³⁺)	18nm	0.178	530.3	0.516	200.8	0.306	60
N7 (1% Nd ³⁺)	14nm	0.166	927	0.628	373	0.206	126
N2 (1% Nd ³⁺)	10nm	0.188	728	0.627	285	0.185	92
N1 (1% Nd ³⁺)	6nm	0.170	513	0.602	212	0.228	64

^a the weight factor (WF_i) illustrating the contribution of each lifetime is given by

$WF_i = A_i / \sum A_i$, where A_i is the coefficient of each decay term in Eq. (4).

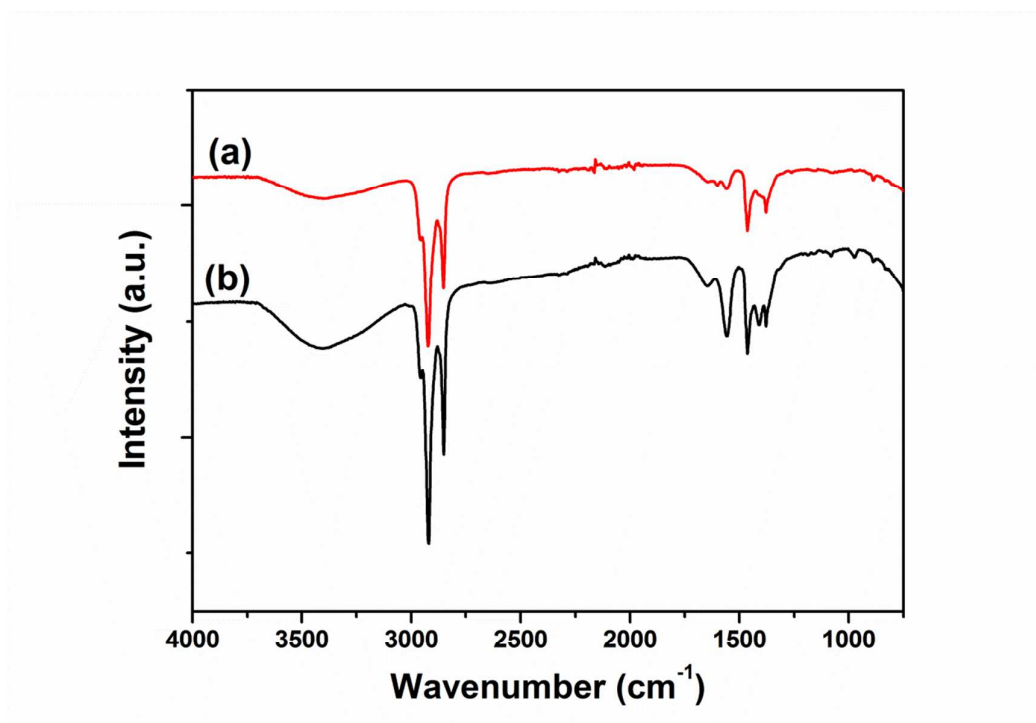


Figure S3. The FTIR spectra of α -NaYF₄:1%Nd³⁺ nanocrystals with the average size of 14 nm which has been dispersed in toluene and kept for (a) more than 6 months (the initial kept sample colloidal) and (b) one month (recently made sample for demonstration).