

Supplementary Information

Double Bond Terminated Ln³⁺ doped LiYF₄ Nanocrystals with Strong Single Band NIR Emission: Simple Click Chemistry Route to Make Water Dispersible Nanocrystals with Various Functional Groups

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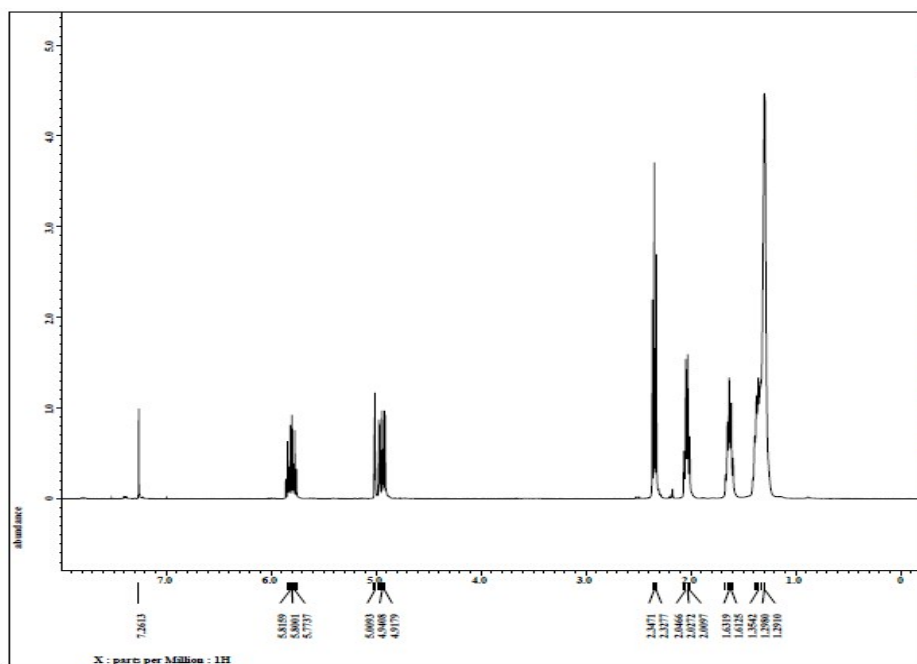


Figure S1: ¹H-NMR spectrum of pure UDA in CDCl₃.

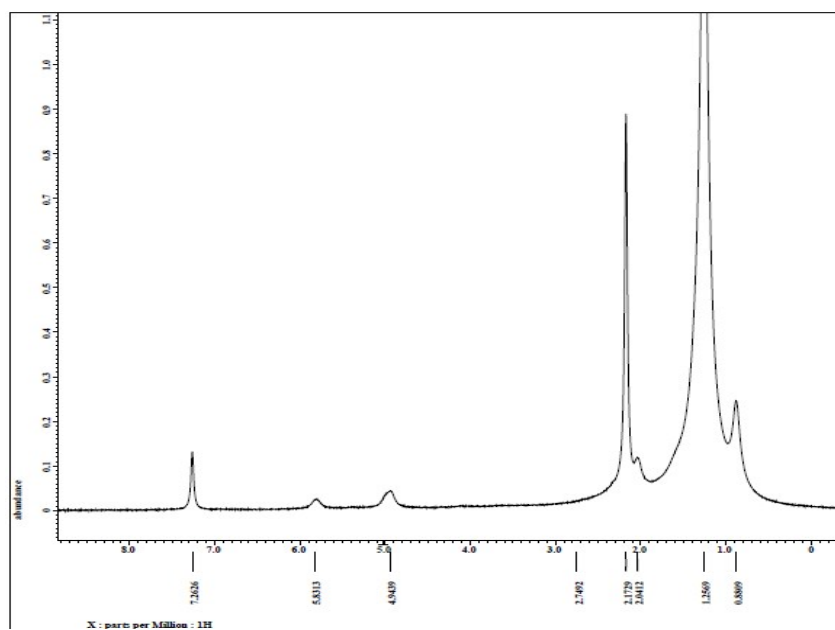


Figure S2: ¹H-NMR spectrum of UDA capped Yb³⁺/Tm³⁺ doped LiYF₄ nanocrystals in CDCl₃.

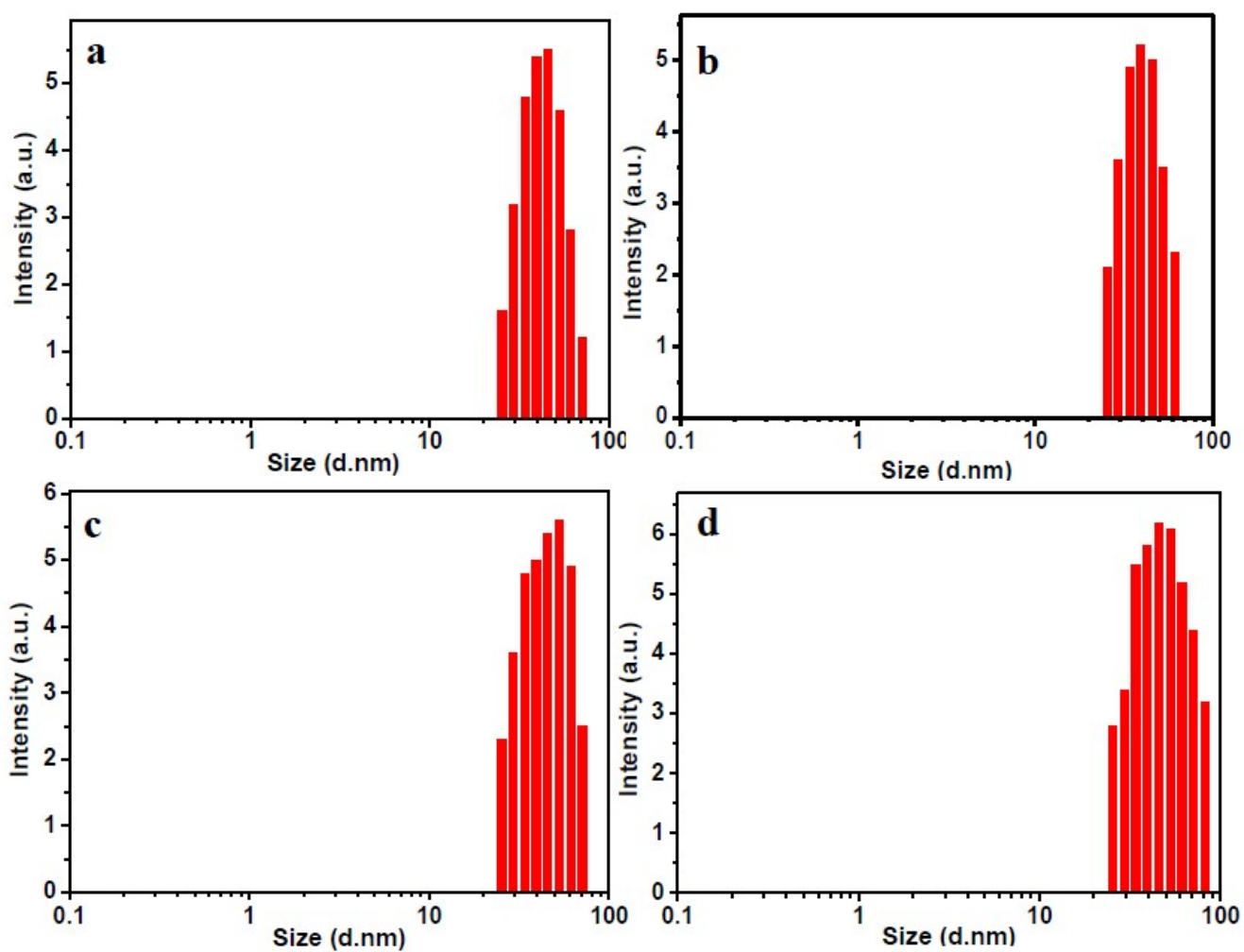


Figure S3. DLS analysis of Yb³⁺/Tm³⁺-doped LiYF₄ nanocrystals in water after thiol-ene click reaction with a) cysteine b) cysteamine c) MPA and d) DMP.

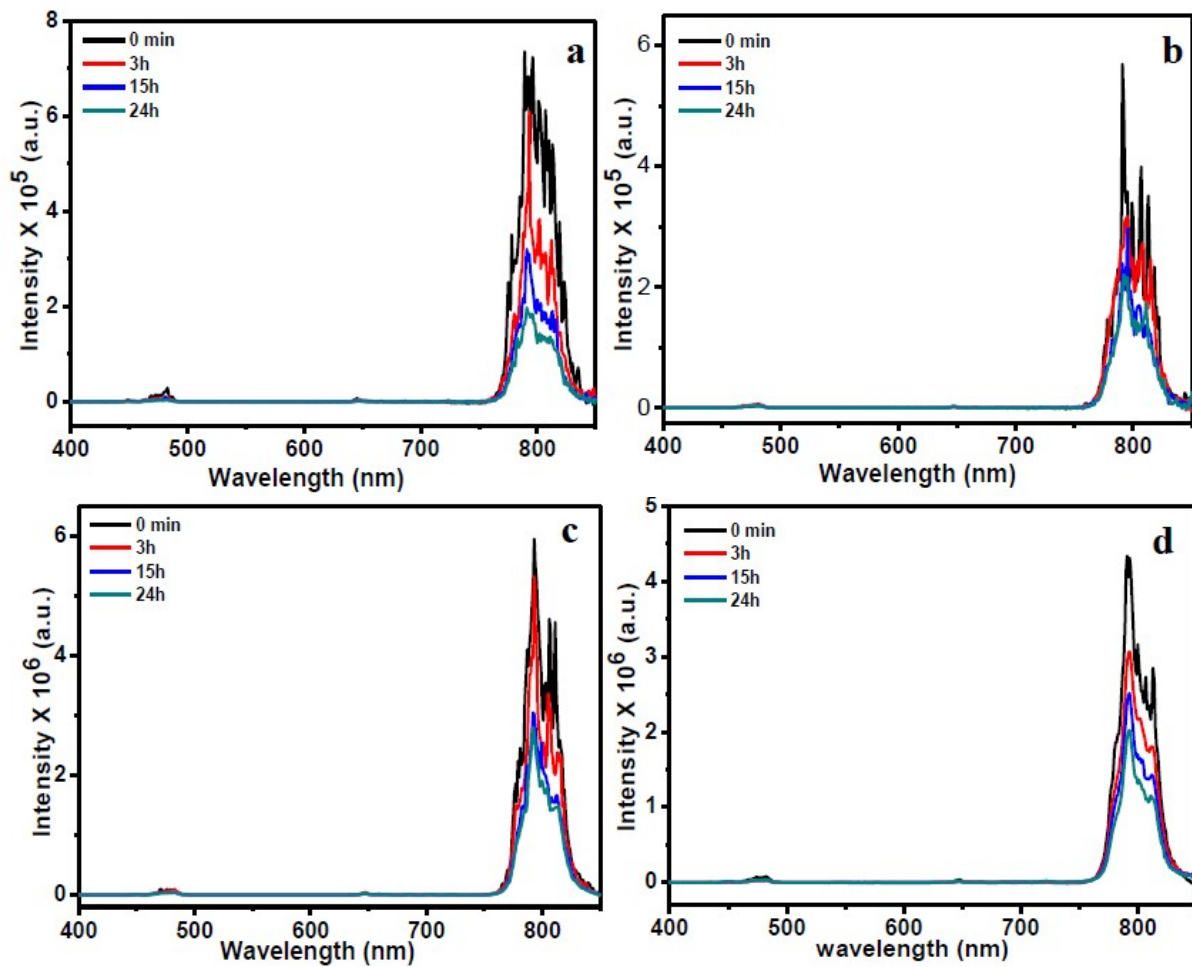


Figure S4. Time dependent upconversion emission spectra of Yb³⁺/Tm³⁺-doped LiYF₄ nanocrystals in water after thiol-ene click reaction with a) cysteine b) cysteamine c) MPA and d) DMP.

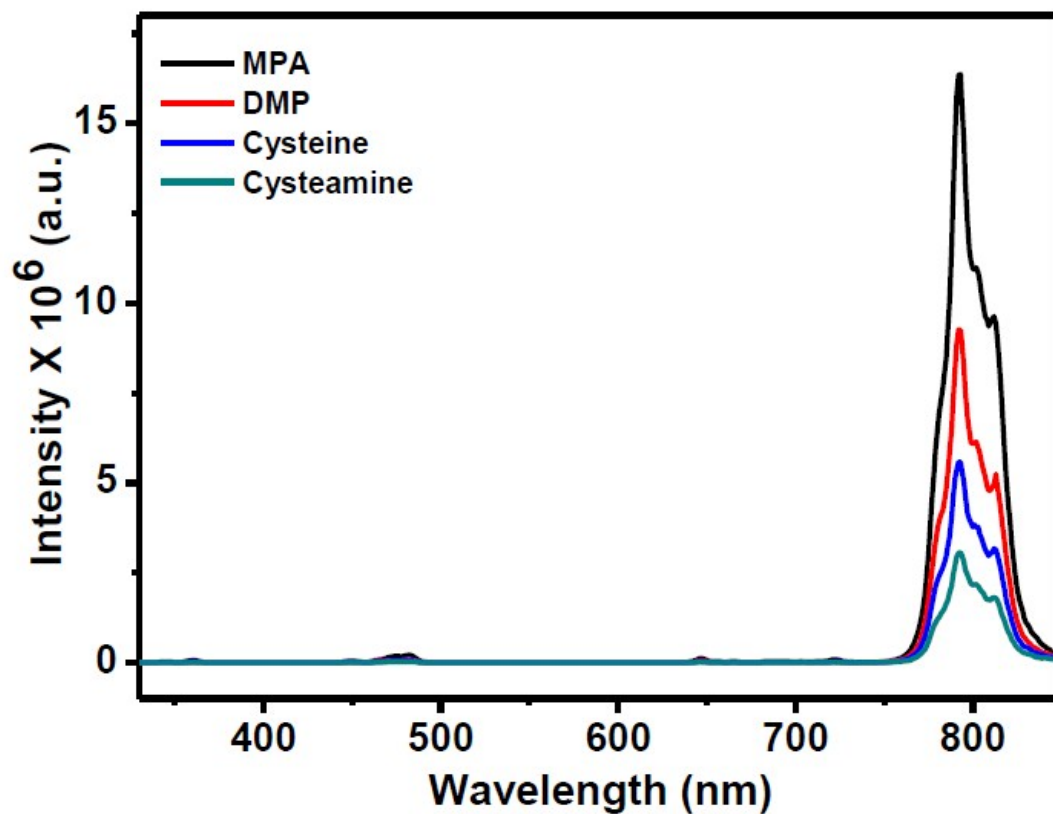


Figure S5. Upconversion emission spectra of UDA capped $\text{Yb}^{3+}/\text{Tm}^{3+}$ doped LiYF_4 nanocrystals in D_2O (0.5 wt%) after thiol-ene modification with cysteine, cysteamine, MPA and DMP.

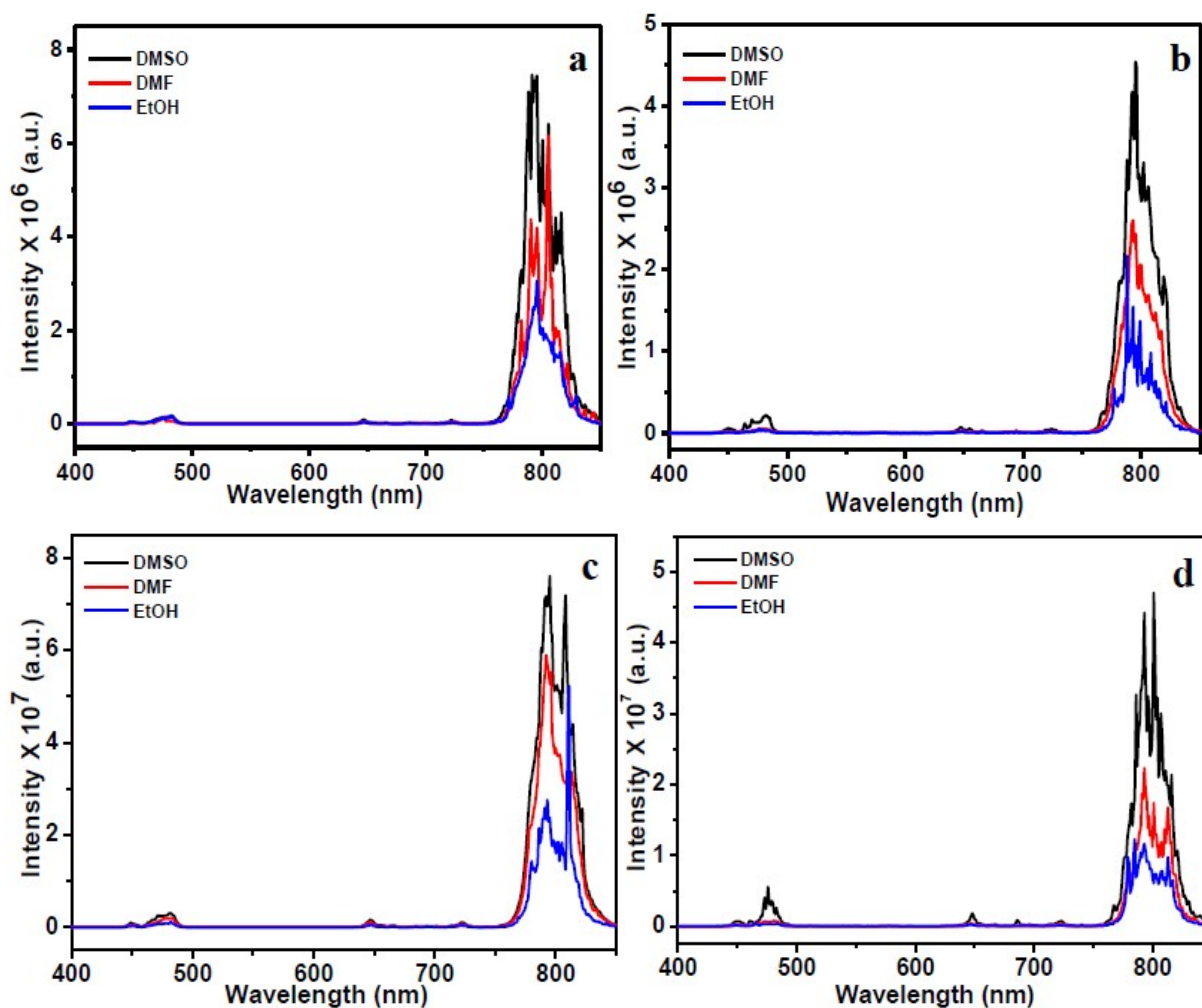


Figure S6. Upconversion emission spectra of Yb³⁺/Tm³⁺-doped LiYF₄ nanocrystals in different solvents after thiol-ene click reaction with a) cysteine b) cysteamine c) MPA d) DMP.

Table S1: Blue (480 nm) to NIR (800 nm) emission ratio for the cysteine, cysteamine, MPA and DMP functionalized nanocrystals four different samples in different solvents.

	Cysteine	Cysteamine	MPA	DMP
Water	0.014	0.0083	0.010	0.011
Ethanol	0.038	0.019	0.024	0.023
DMF	0.015	0.013	0.023	0.029
DMSO	0.015	0.032	0.027	0.053