Supporting Information:

Rare Earth Doped Bifunctional Alkaline Earth Metal Fluoride Nanocrystals via a Facile Microwave-Assisted Process

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Experimental Supplement:

All the synthesis processes were performed on a programmed microwave synthesis reactor (START SYNTH, Milestone) equipped with inner symmetrical quartz tubes. The tubes were located on a rotated plate, which could make all the reactions in the same condition. The temperature was monitored by an inner IR detector. All the reaction parameters were programmed with optimized heating time, target temperature and standing time. For a typical experiment, the set parameters are as follows: microwave irradiation power of 600 W, increasing time 10 min, target temperature 170 ^{o}C, standing time 10 min, standing temperature 170 ^{o}C. To remove residual ethylene glycol (EG) and unreacted raw reagents, the particles were redispersed in ethanol and centrifuged for two more times. The final nanoparticles were redispersed and stored in ethanol for characterization.

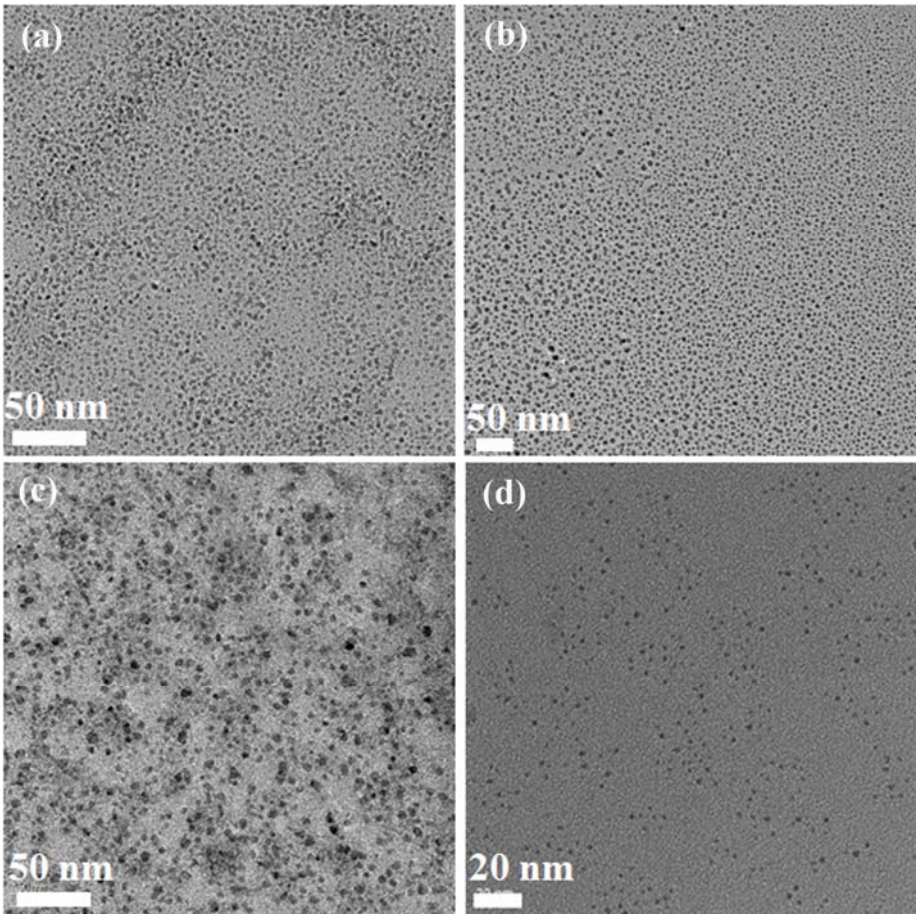

Figure S1. TEM images of (a) CaF_2:(5%-5%), (b) SrF_2:(5%-5%), (c) BaF_2:(5%-5%) and (d) SrF_2:(5%-5%-20%) NCs.

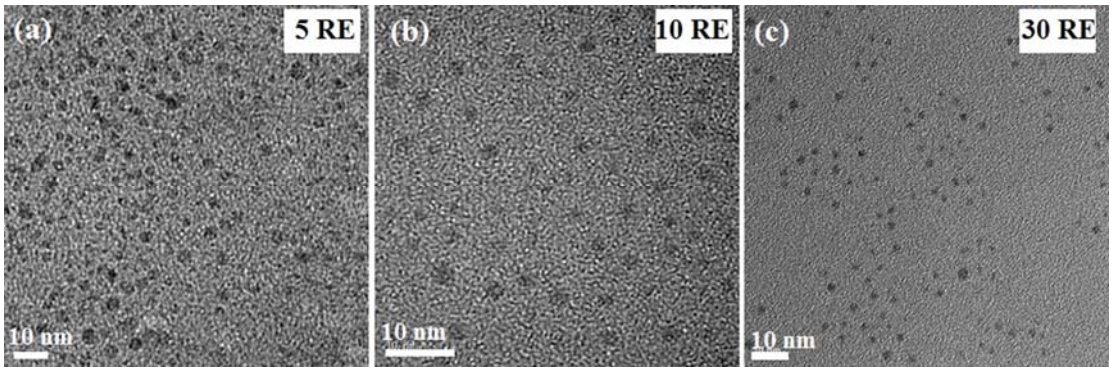

Figure S2. TEM images of SrF_2 NCs doped with various contents of trivalent rare earth ions. (a) SrF:(5%), (b) SrF_2:(5%-5%), (c) SrF_2:(5%-5%-20%) [5%, 5%-5%, 5%-5%-20% (totally 5%, 10% and 30% RE; abbreviated as 5 RE, 10 RE and 30 RE, respectively)].

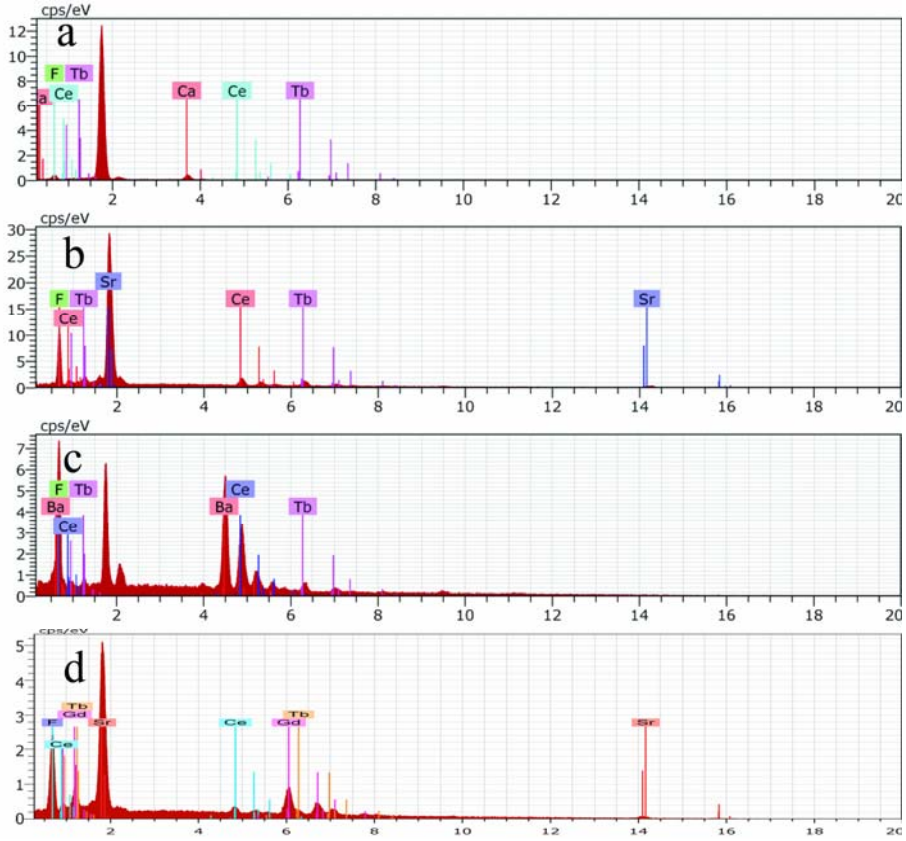

Figure S3. EDX spectra of (a) CaF_2:(5%-5%); (b) SrF_2:(5%-5%); (c) BaF_2:(5%-5%) and (d) SrF_2:(5%-5%-20%) NCs.

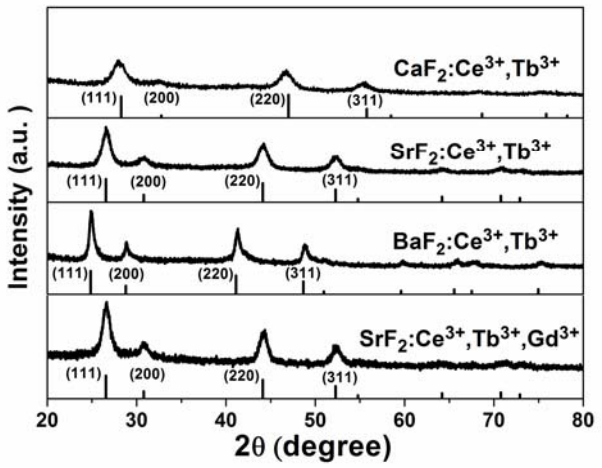

Figure S4. XRD patterns of CaF_2:(5%-5%), SrF_2:(5%-5%), BaF_2:(5%-5%) and SrF_2:(5%-5%-20%) NCs.

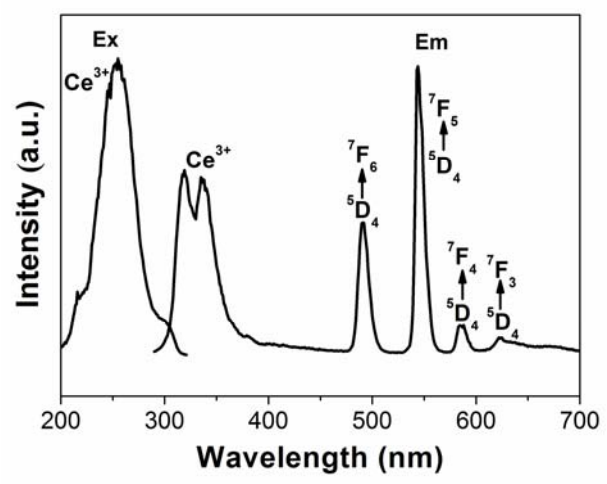

Figure S5. Excitation (Ex) and emission (Em) spectra of CaF_2:(5%-5%) NCs in ethanol solution.

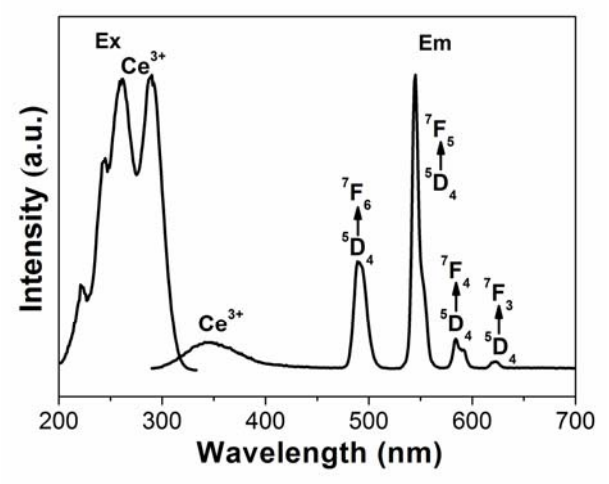

Figure S6. Excitation (Ex) and emission (Em) spectra of BaF_2:(5%-5%) NCs in ethanol solution.

Table S1. Inductively coupled plasma optical emission spectrometer (ICP) results for molar ratios of MF_2:(5%-5%) (M = Ca, Sr, Ba) NCs.

Ca/Ce/Tb	1	0.059	0.053
Sr/Ce/Tb	1	0.050	0.049
Ba/Ce/Tb	1	0.057	0.054