

Supporting Information

**Interacting layered hydroxide nanosheets with KF leading to  
Y/Eu hydroxyfluoride, oxyfluoride, and complex fluoride  
nanocrystals and investigation of photoluminescence**

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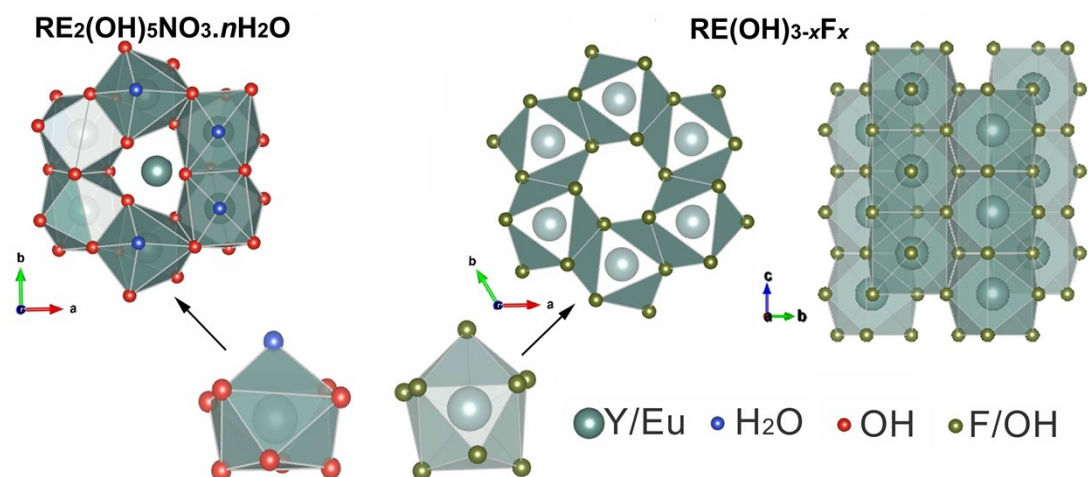
Bohai University

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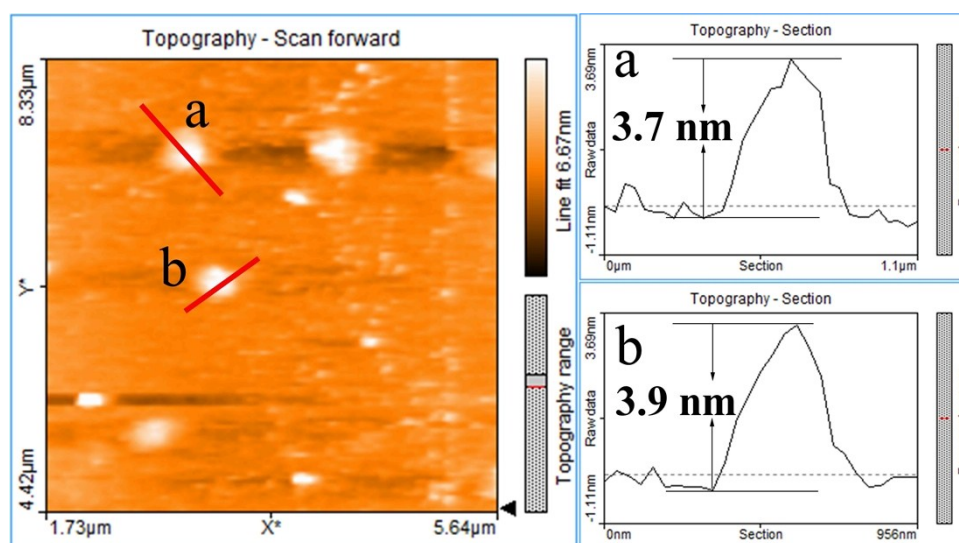
Dr. Ji-Guang Li

National Institute for Materials Science

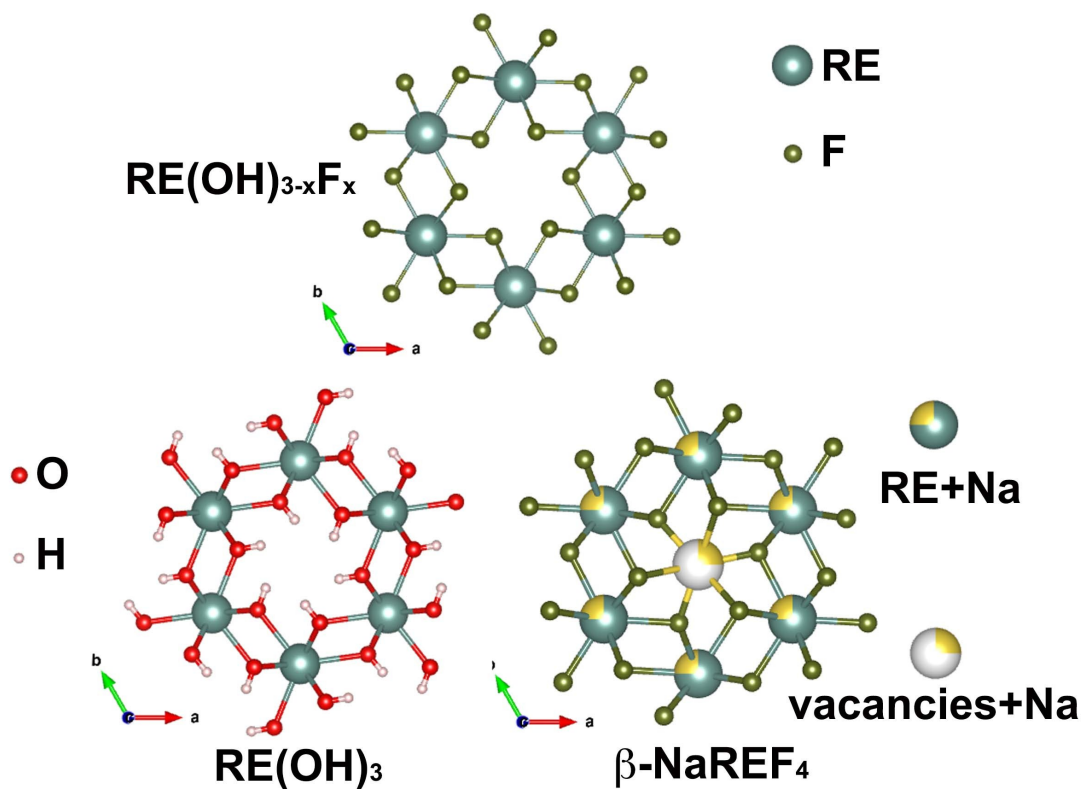
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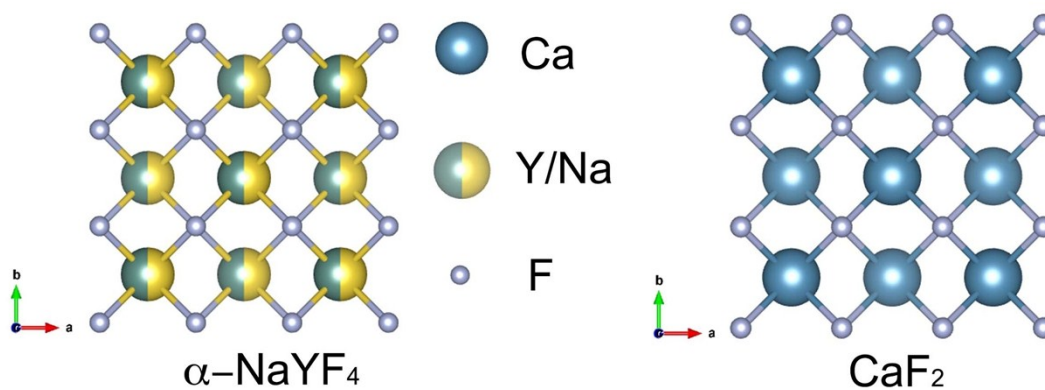
**Fig. S1** The crystal structure of RE<sub>2</sub>(OH)<sub>5</sub>NO<sub>3</sub>·nH<sub>2</sub>O and hexagonal RE(OH)<sub>3-x</sub>F<sub>x</sub> (realized with the Vesta software).



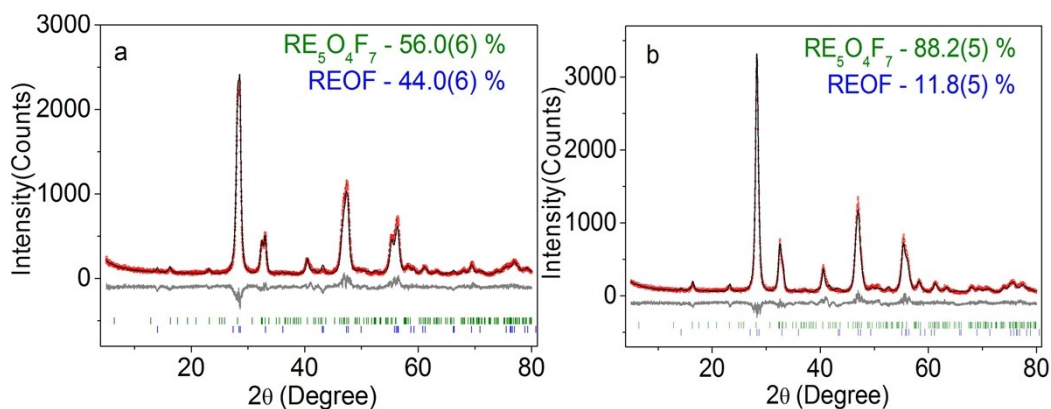
**Fig. S2** AFM image (left panel) and height profiles (right panel) of the LREH-NO<sub>3</sub><sup>-</sup> nanosheets. The height profiles were obtained along the red lines marked for the nanosheets in the AFM image, respectively.



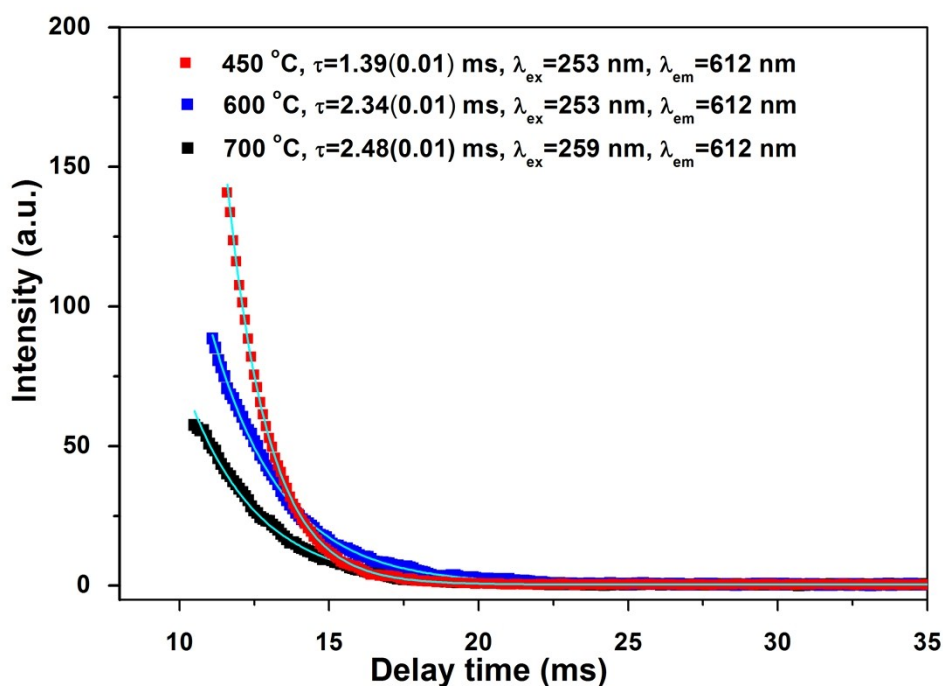
**Fig. S3** The crystal structure of  $\text{RE(OH)}_{3-x}\text{F}_x$ , hexagonal  $\text{RE(OH)}_3$ , and hexagonal  $\beta\text{-NaREF}_4$  (realized with the Vesta software).



**Fig. S4** The crystal structure of  $\alpha\text{-NaREF}_4$  and  $\text{CaF}_2$  (realized with the Vesta software).



**Fig. S5** Rietveld fitting of the powder XRD patterns for the products obtained by calcining the  $\text{RE}(\text{OH})_{3-x}\text{F}_x$  of  $x=1.15$  (a,  $R=20:3$ ) and  $x=1.23$  (b,  $R=30:3$ ) in air at  $450^\circ\text{C}$  for 2 h. The derived phase constituents are included in the figures.



**Fig. S6** Fluorescence decay kinetics (scattered data) and the results of exponential fitting (solid lines) for the oxyfluoride phosphors calcined from  $\text{RE}(\text{OH})_{1.49}\text{F}_{1.51}$  ( $R=70:3$ ) in air the various temperatures indicated in the figure. The excitation and emission wavelengths used for measurements, the calcination temperature, and the derived lifetime ( $\tau$ ) values are included in the figure.