Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Novel Topotactic Transformation Route Towards Monodisperse YOF:Ln^{3+} (Ln=Eu, Tb, Yb/Er, Yb/Tm) Microcrystals with Multicolor Emissions

Senwen Yuan,[a] Baiqi Shao,[a] Yang Feng,[a,b] Shuang Zhao,[a,b] Jiansheng Huo,[a,b] Langping Dong,[a,b] and Hongpeng You*[a]*

[a]State Key Laboratory of Rare Earth Resource Utilization, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022,

[b]University of the Science and Technology of China, Hefei 230026, P. R. China

Synthesis of $Y(OH)_3$ Micro Hexagonal prisms. NaOH solution (2M) wad added into 35 mL aqueous mixture containing 0.25 mmoL $Y_4O(OH)_9NO_3$ until the pH value was 12. After stirring for 10 min, the mixture was sealed in 50 mL Teflon-lined autoclave and maintained at 200 ^oC for 12 h. After the reaction was finished, the white products were collected and washed with deionized water and absolute ethanol twice in turn, and air dried at 60 ^oC overnight.

Synthesis of β-$NaYF_4$ Micro Hexagonal Bundles. 30 mL aqueous solution containing 30 mmoL NaF was added into 10 mL aqueous mixture containing 0.25 mmoL $Y_4O(OH)_9NO_3$. After stirring for 10 min, the mixture was sealed in 50 mL Teflon-lined autoclave and maintained at 180 ^oC for 12 h. After the reaction was finished, the white products were collected and washed with deionized water and absolute ethanol twice in turn, and air dried at 60 ^oC overnight.

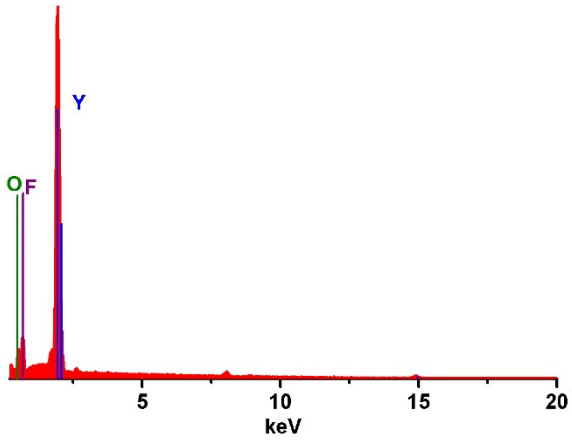

Figure S1. EDS patter of the $Y(OH)_{2.02}F_{0.98}$ intermediate product. The peak at about 8 keV comes from the Cu substrate.

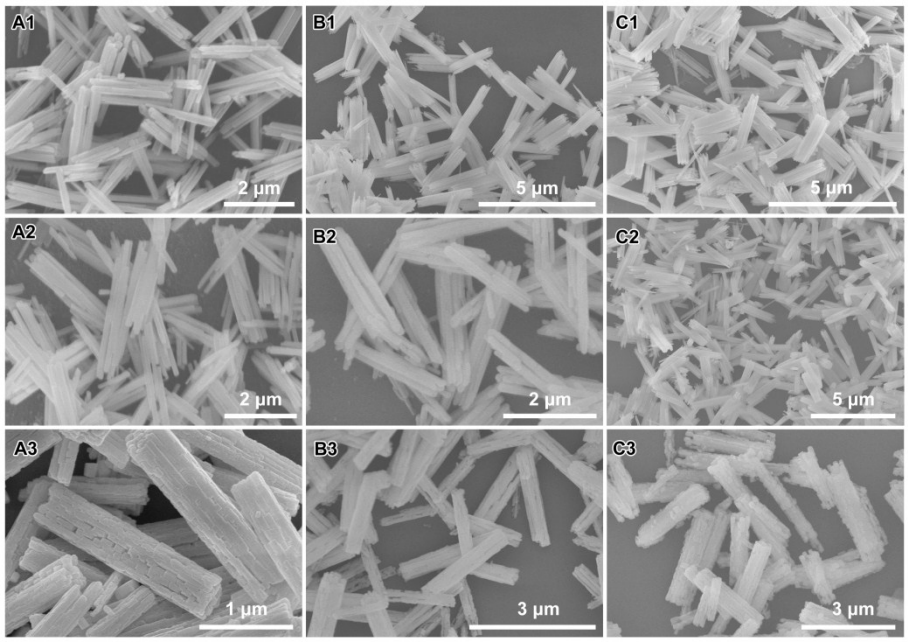

Figure S2. SEM images of the final products with different NaF-$Y_4O(OH)_9NO_3$ feeding ratios (row) and reaction temperature (column). NaF-$Y_4O(OH)_9NO_3$ feeding ratio in Row1 is 5-0.25, in Row2 is 10-0.25, and in Row3 is 20-0.25; reaction temperature in column A is 120 ^oC, in column B is 150 ^oC, and in column C is 180 ^oC.

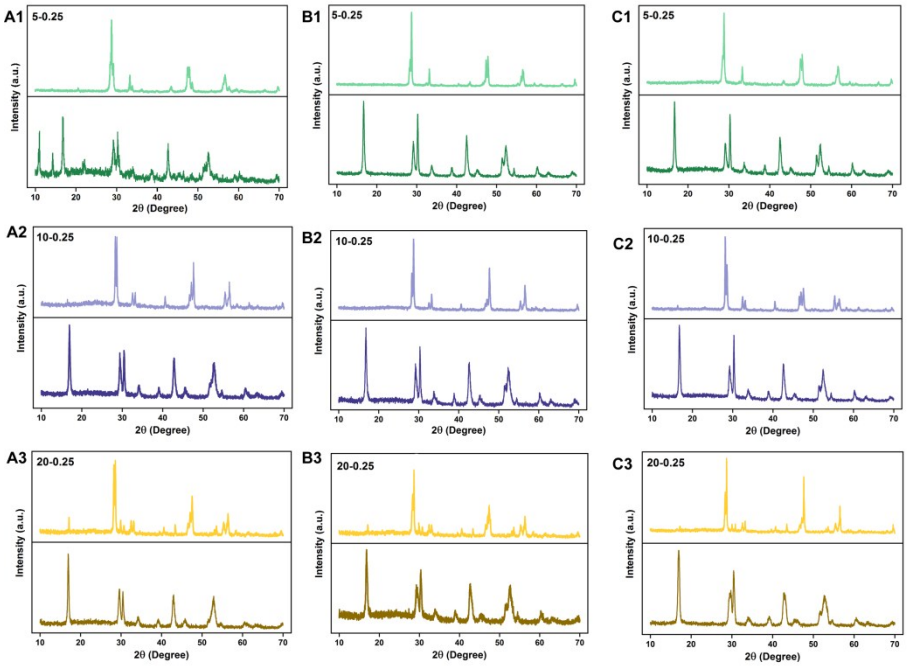

Figure S3. XRD patterns of the intermediate products and the final product with different NaF-$Y_4O(OH)_9NO_3$ Feeding Ratios (row) and Temperature (column). In each panel, the lower part is the intermediate product, and the upper part is the final product. NaF-$Y_4O(OH)_9NO_3$ feeding ratio in Row1 is 5-0.25, in Row2 is 10-0.25, and in Row3 is 20-0.25; reaction temperature in column A is 120 ^oC, in column B is 150 ^oC, and in column C is 180 ^oC.

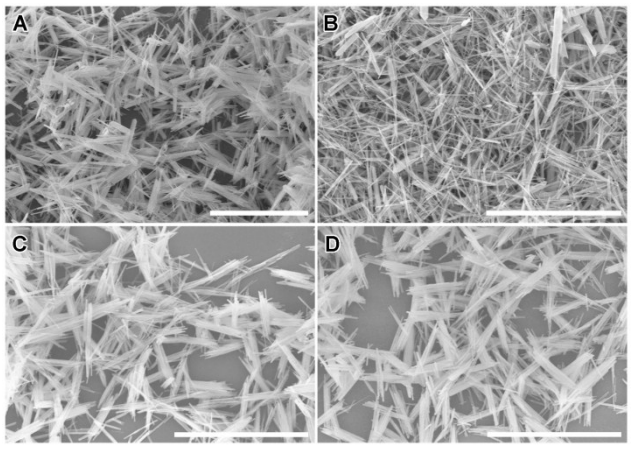

Figure S4. SEM images of the final products with different NH_4F-$Y_4O(OH)_9NO_3$ feeding ratios (A) 0.5-0.25, (B) 1-0.25, (C) 1.5-0.25, and (D) 2-0.25. The scale bars are 5 μm.

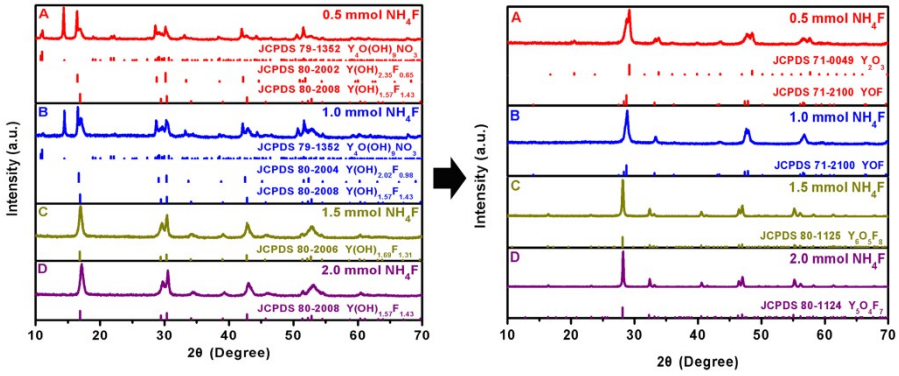

Figure S5. The XRD patterns of the intermediate products (left panel) and the final product (right panel) with different NH_4F-$Y_4O(OH)_9NO_3$ feeding ratios (A) 0.5-0.25, (B) 1-0.25, (C) 1.5-0.25, and (D) 2-0.25.