

Supporting information

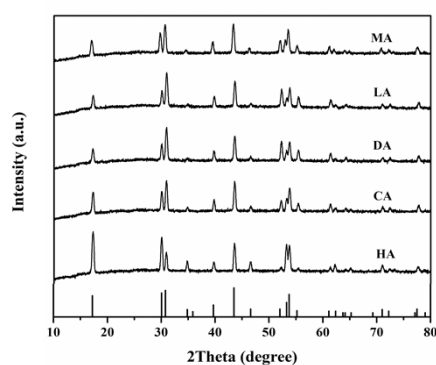


Figure S1. The XRD patterns of the as-prepared samples with different ligands at 7 h. (F/Y=4, $n(\text{NaOH})/n(\text{Acid})=0.61$, $V(\text{H}_2\text{O})/V(\text{EtOH})=1.07$, 200 °C)

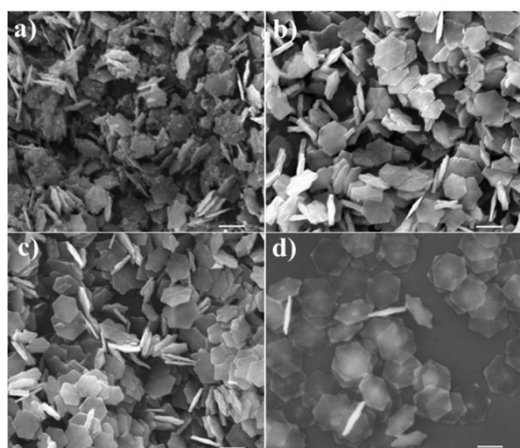


Figure S2. SEM images of $\beta\text{-NaYF}_4$ prepared with LA at different reaction time: (a) 2 h, (b) 3 h, (c) 5 h, (d) 7 h (F/Y=4, $n(\text{NaOH})/n(\text{Acid})=0.61$, $V(\text{H}_2\text{O})/V(\text{EtOH})=1.07$, 200 °C; the scale bars are all set as 1 μm)

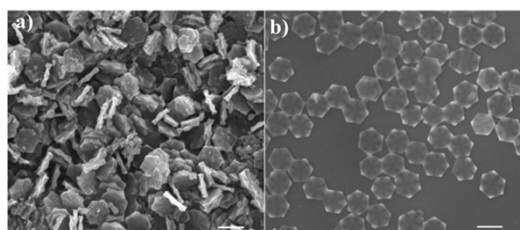


Figure S3. SEM images of $\beta\text{-NaYF}_4$ prepared with MA at different reaction time: (a) 5 h, (d) 7 h (F/Y=4, $n(\text{NaOH})/n(\text{Acid})=0.61$, $V(\text{H}_2\text{O})/V(\text{EtOH})=1.07$, 200 °C; the scale bars are all set as 1 μm)

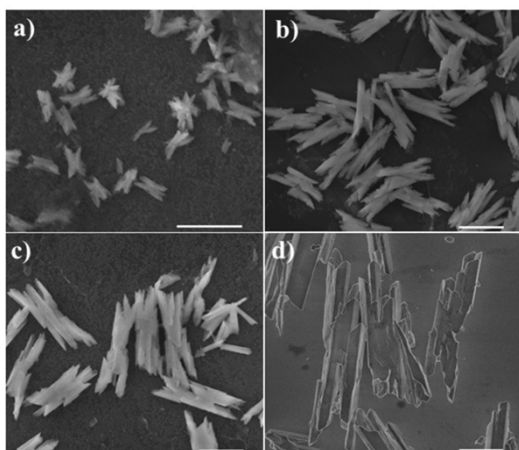


Figure S4. SEM images of β - NaYF_4 prepared with BA at different reaction time: (a) 2 h, (b) 5 h, (c) 7 h, (d) 24 h ($F/Y=4$, $n(\text{NaOH})/n(\text{Acid})=0.61$, $V(\text{H}_2\text{O})/V(\text{EtOH})=1.07$, $200\text{ }^\circ\text{C}$; the scale bars are all set as $5\text{ }\mu\text{m}$)

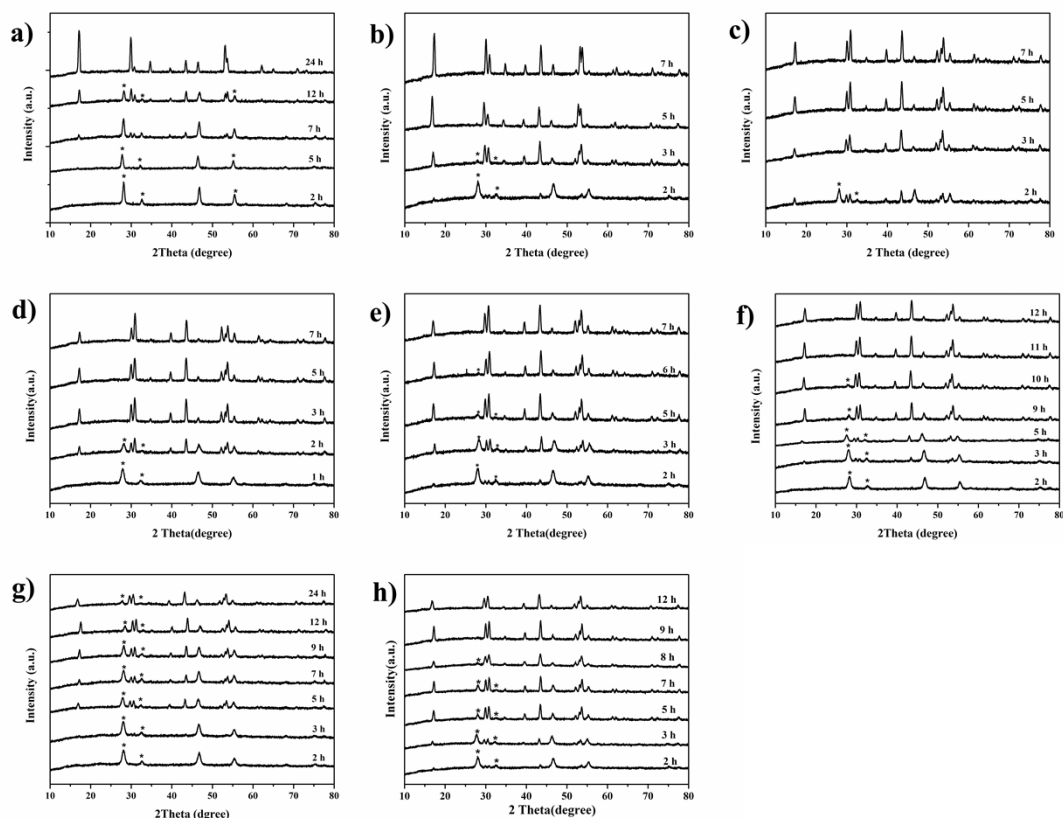


Figure S5 XRD patterns of NaYF_4 prepared with different ligands at different reaction time: (a) BA; (b) HA; (c) CA; (d) LA; (e) MA; (f) PA; (g) SA; (h) OA. ($F/Y=4$, $n(\text{NaOH})/n(\text{Acid})=0.61$, $V(\text{H}_2\text{O})/V(\text{EtOH})=1.07$, $200\text{ }^\circ\text{C}$)