Electronic Supplementary Information (ESI)

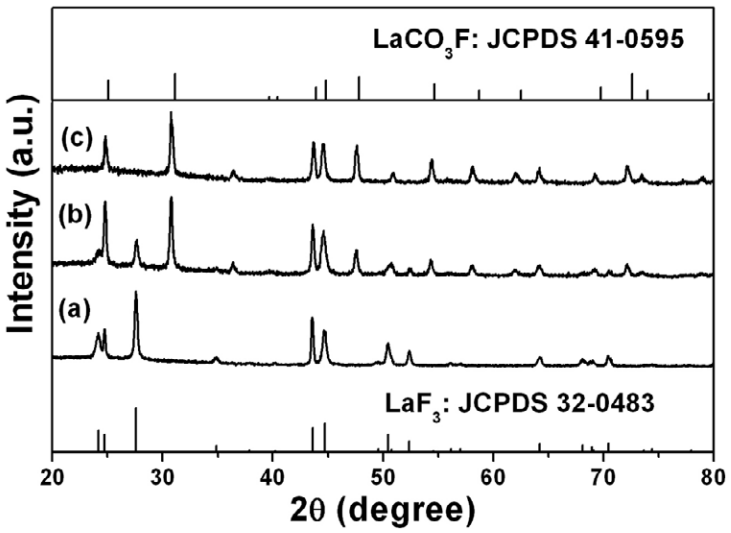

Figure S1. XRD patterns of the as-prepared products using $NaBF_4$ as the F^- source at different amount of Na_2CO_3: (a) 8 mmol, (b) 12 mmol, (c) 14 mmol. The standard data of hexagonal LaF_3 (JCPDS No. 32-0483) and hexagonal $LaCO_3F$ (JCPDS No. 41-0595) are used as references.

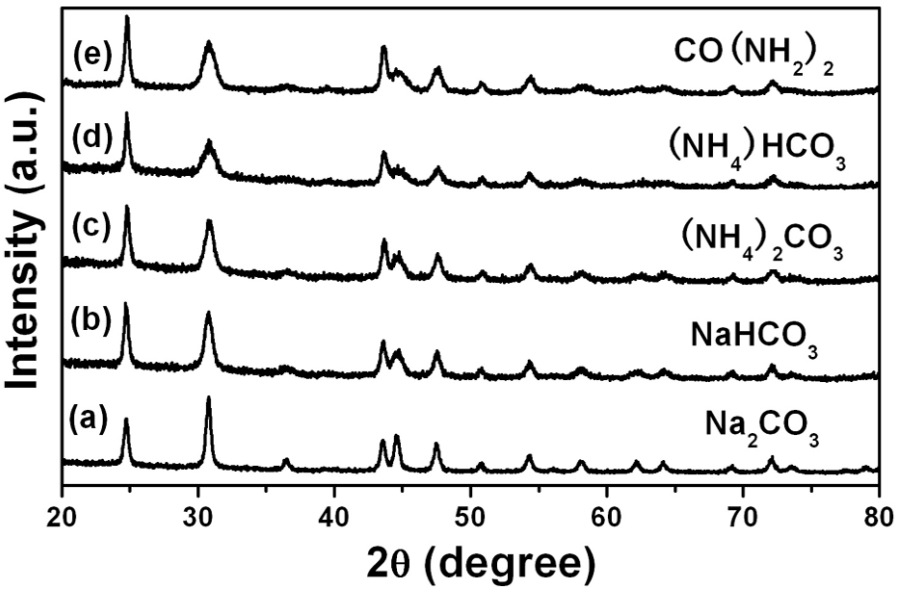

Figure S2. The XRD patterns of as-prepared $LaCO_3F$ products at pH = 9 using different carbon sources: (a) Na_2CO_3, (b) $NaHCO_3$, (c) $(NH_4)_2CO_3$ (d) NH_4HCO_3, (e) $CO(NH_2)_2$.

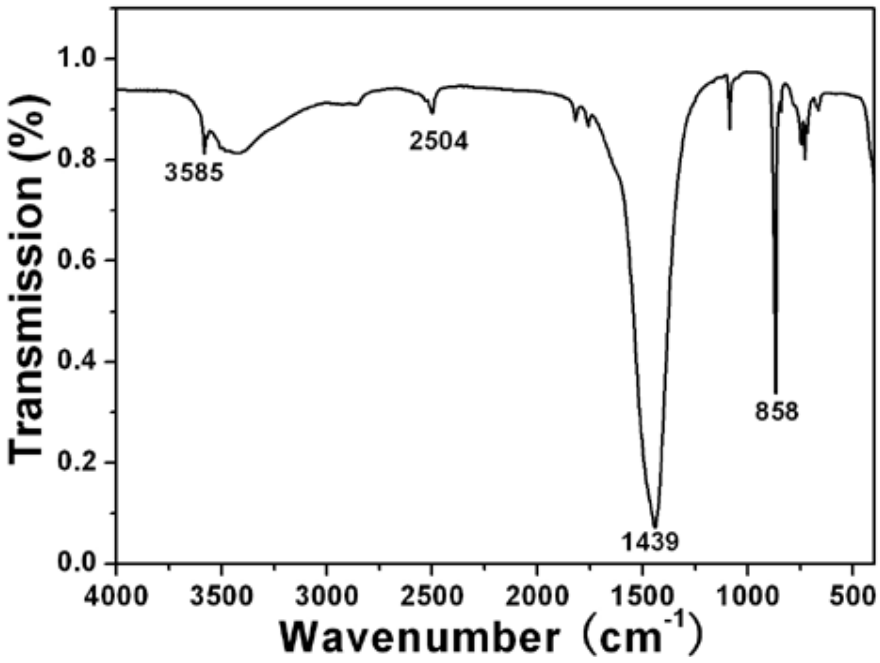

Figure S3. FT-IR spectrum of the as-synthesized $LaCO_3F$ product prepared at pH = 9 using Na_2CO_3 as carbon source.

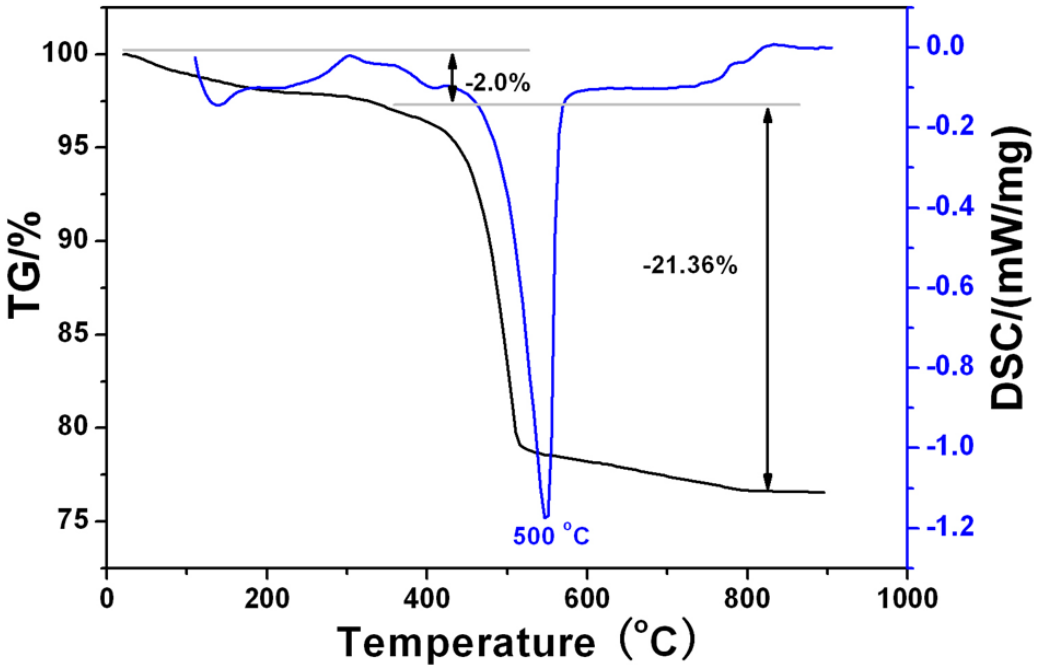

Figure S4. TG-DSC curves of as-prepared $LaCO_3F$ precursor at pH = 9 using Na_2CO_3 as carbon source.

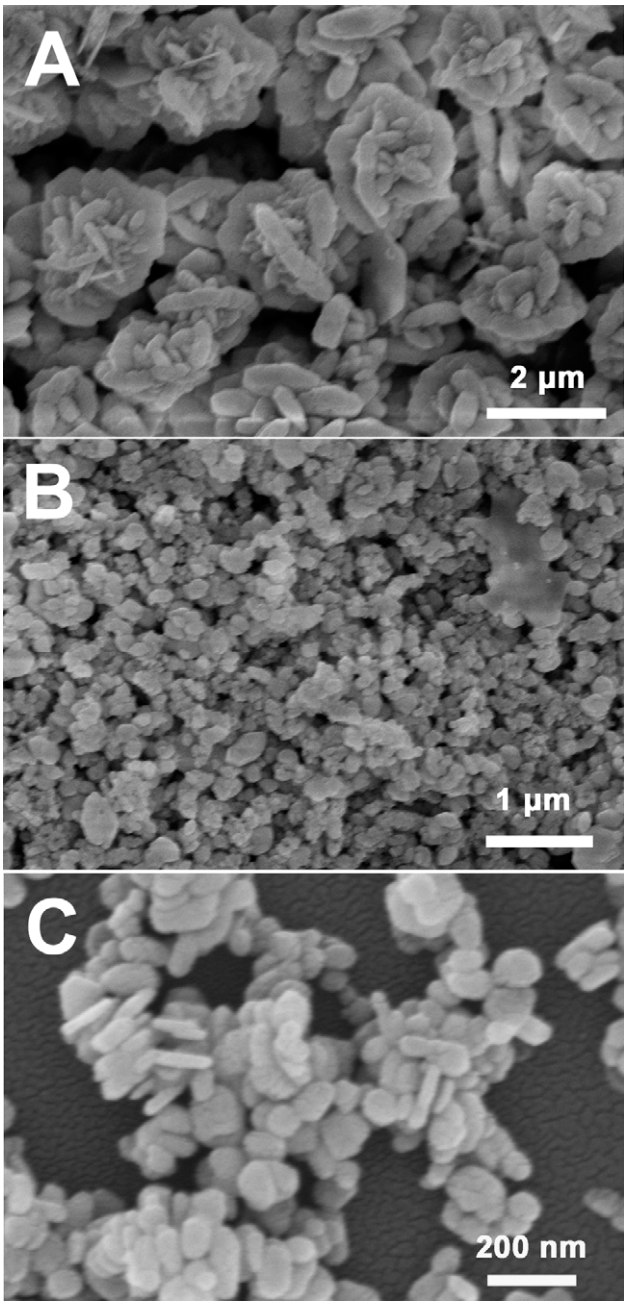

Figure S5. SEM images of the as-prepared products using $NaBF_4$ as the F^- source at different amount of Na_2CO_3: (A) 14 mmol, $LaCO_3F$; (B) 12 mmol, $LaF_3 + LaCO_3F$; (C) 8 mmol, LaF_3.

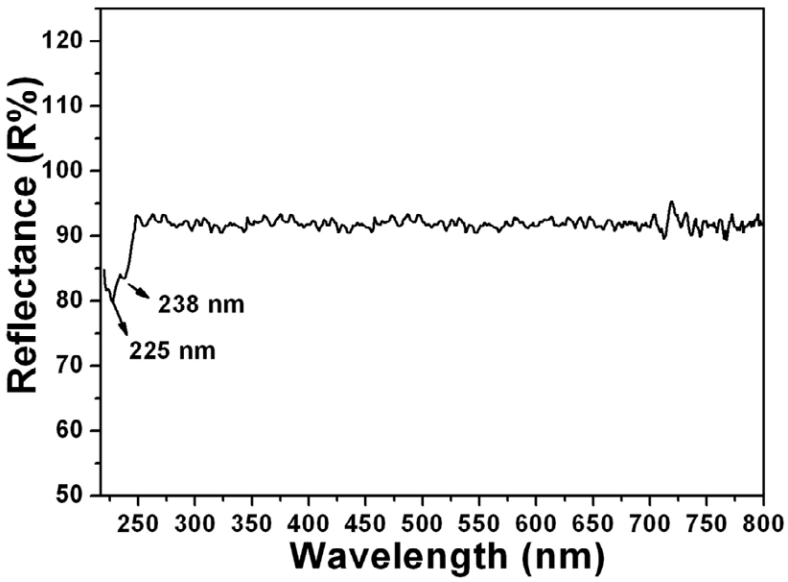

Figure S6. Diffuse reflection spectrum of LaOF product obtained by calcining $LaCO_3F$ at 600 ^oC for 4 h.