

Supporting Information for

**Direct conversion mechanism from BiOCl nanosheets to BiOF,
Bi₇F₁₁O₅ and BiF₃ in the presence of fluorine resource**

Yandong Kan, Fei Teng,* Yang Yang, Juan Xu, Liming Yang

*Jiangsu Engineering and Technology Research Center of Environmental Cleaning
Materials (ECM), Jiangsu Key Laboratory of Atmospheric Environment Monitoring
and Pollution Control (AEMPC), Jiangsu Joint Laboratory of Atmospheric Pollution
Control (APC), Collaborative Innovation Center of Atmospheric Environment and
Equipment Technology (AEET), School of Environmental Science and Engineering,
Nanjing University of Information Science & Technology, 219 Ningliu Road,
Nanjing 210044, China*

* Corresponding author. Tel./Fax.: +86-25-58731090; Email address: tfwd@163.com

Table S1 The elemental composition of the Bi₇F₁₁O₅/BiOCl sample from EDS analysis.

Elements	<i>wt%</i>	<i>at%</i>
O	7.18	30.41
F	9.85	35.14
Cl	4.77	9.11
Bi	78.20	25.35

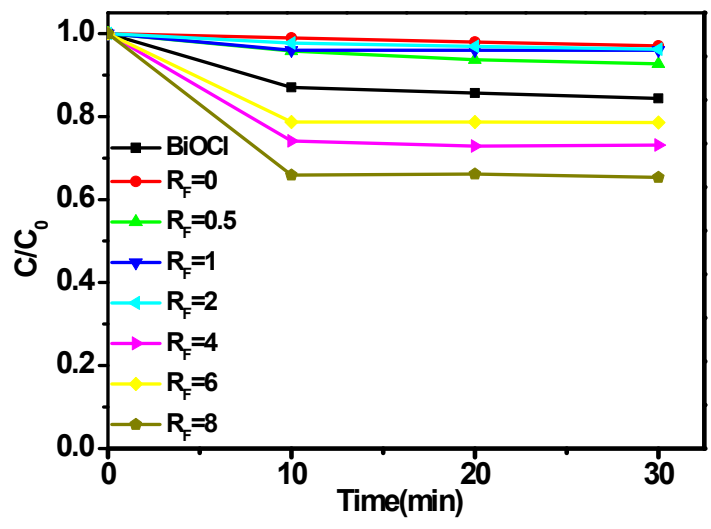


Fig. S1 The adsorption curves of the samples.

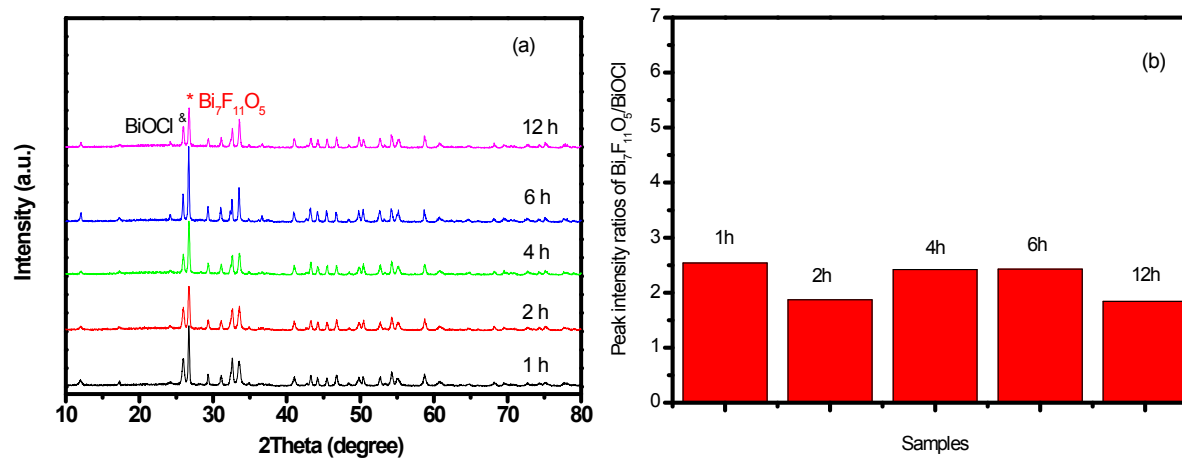


Fig. S2 (a) XRD patterns of the samples prepared at different reaction time with NH₄F ($R_F=2$, $V_{Eth}:V_w=18:2$); (b) The intensity ratios of the strongest peaks for Bi₇F₁₁O₅ and BiOCl.

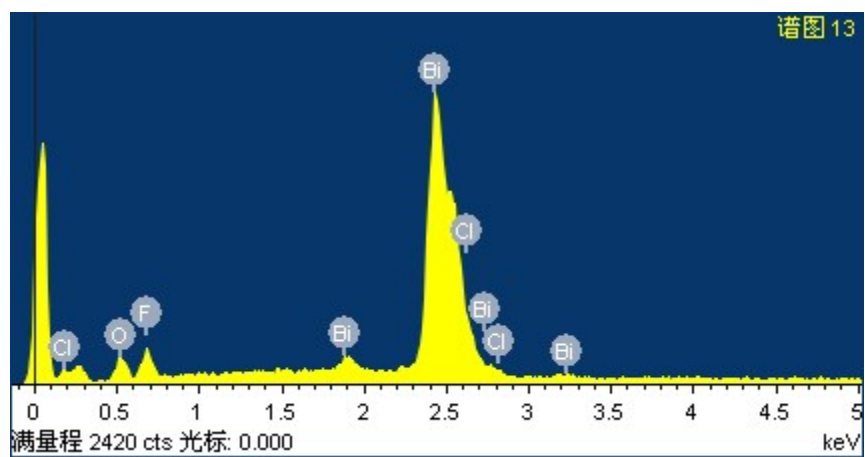
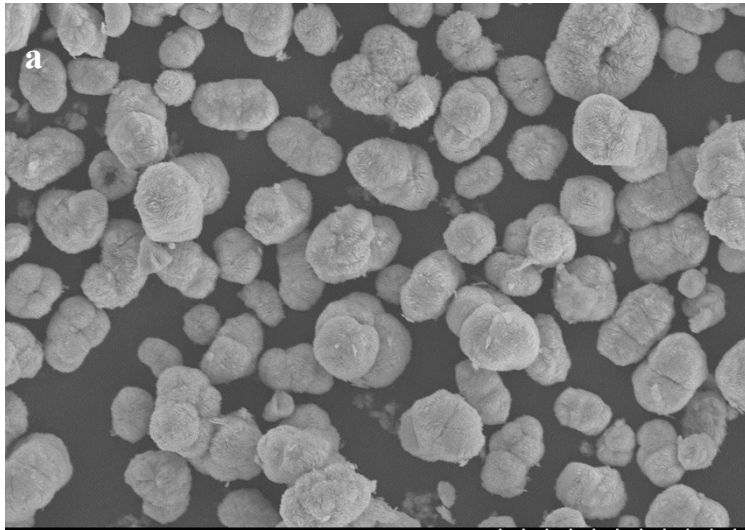
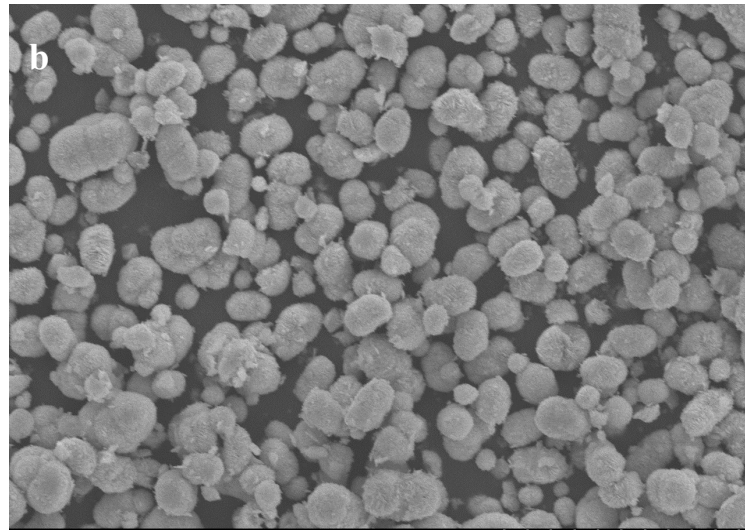


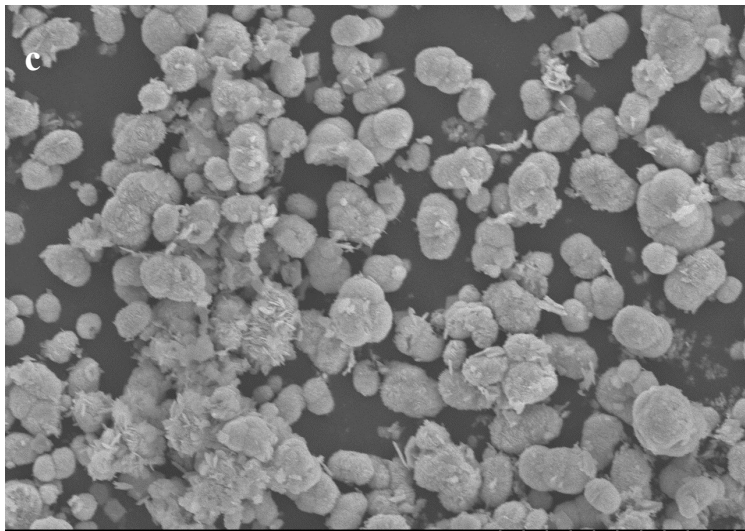
Fig. S3 The EDS of the $\text{Bi}_7\text{F}_{11}\text{O}_5/\text{BiOCl}$ sample.



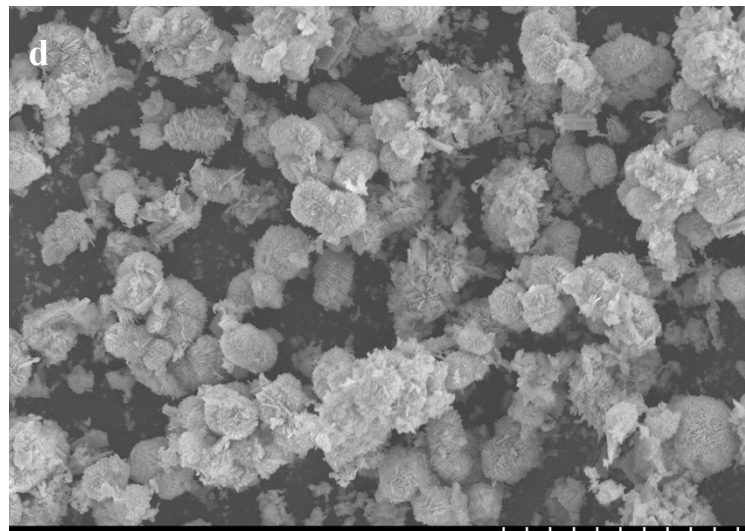
SU1510 15.0kV 9.1mm x2.00k SE 20.0um



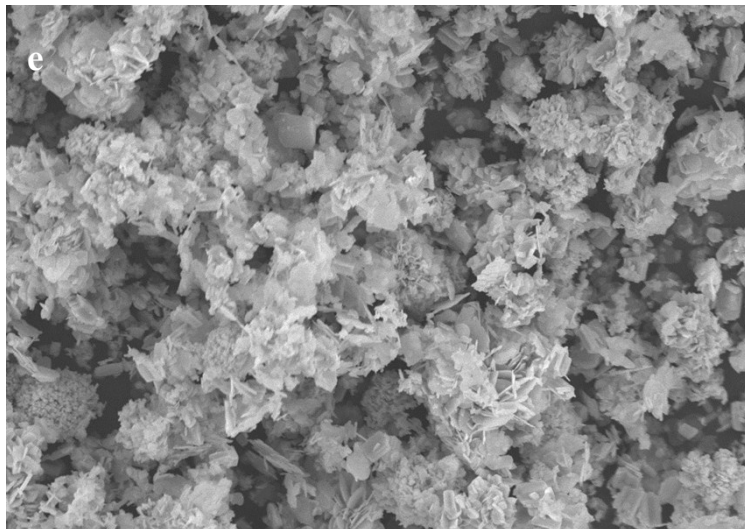
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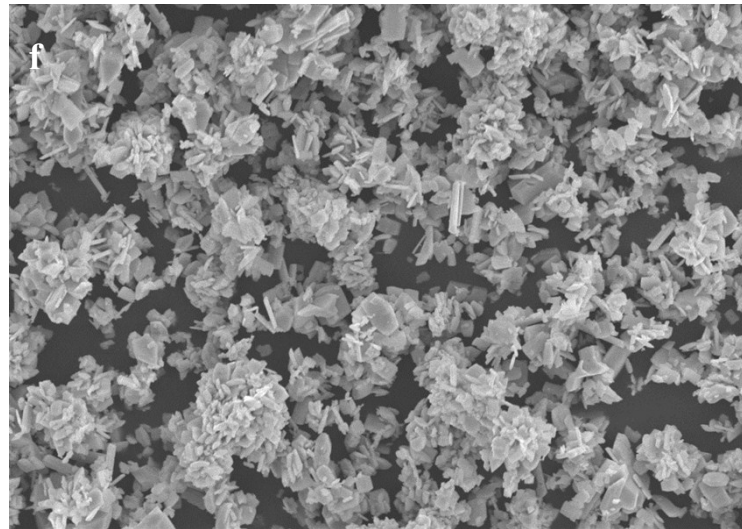
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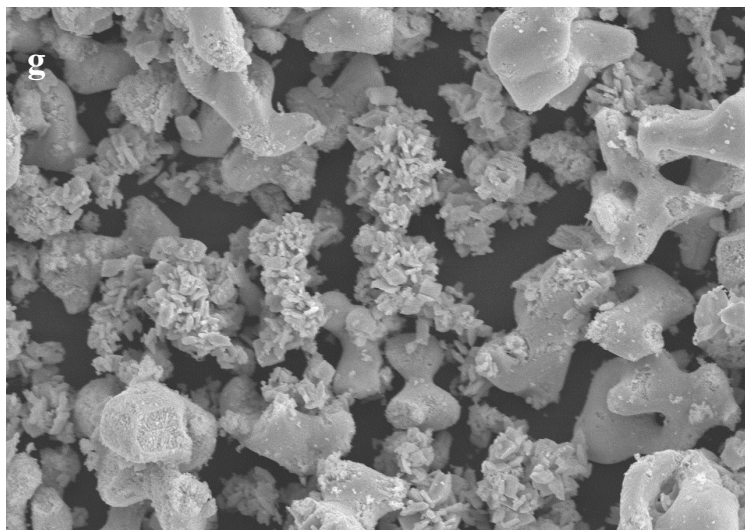
SU1510 15.0kV 9.1mm x2.00k SE 20.0um



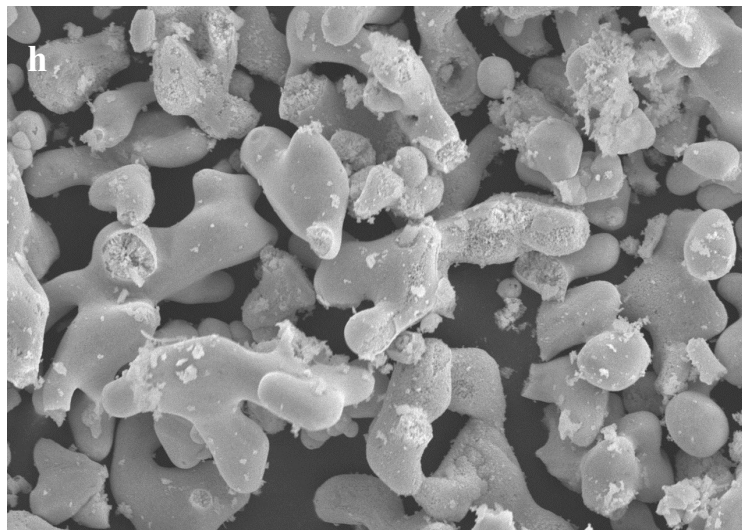
SU1510 15.0kV 8.9mm x2.00k SE 20.0um



SU1510 15.0kV 8.9mm x2.00k SE 20.0um



SU1510 15.0kV 9.0mm x2.00k SE 20.0um



SU1510 15.0kV 9.0mm x2.00k SE 20.0um

Fig. S4 SEM images of the untreated BiOCl and treated samples by NH₄F at different molar ratios of F to Bi (R_F): (a) untreated BiOCl; (b) $R_F=0$ (BiOCl); (c) $R_F=0.5$ (BiOF/BiOCl); (d) $R_F=1$ (BiOF/Bi₇F₁₁O₅/BiOCl); (e) $R_F=2$ (Bi₇F₁₁O₅/BiOCl); (f) $R_F=4$ (Bi₇F₁₁O₅); (g) $R_F=6$ (Bi₇F₁₁O₅/BiF₃); (h) $R_F=8$ (BiF₃). Preparation conditions: $V_{\text{Eth}}/V_{\text{w}}=18/2$ (volumetric ratio of ethanol to water)

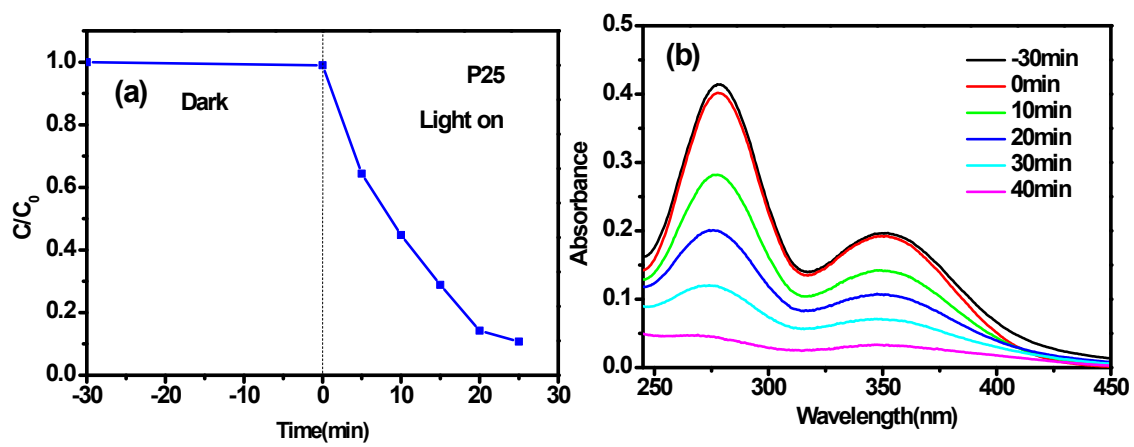


Fig. S5 (a) Degradation curves of MO over commercial P25; (b) UV-vis absorption spectra of 2-nitrophenol (10 mg/L) over Bi₇F₁₁O₅/BiOCl sample at different reaction times.

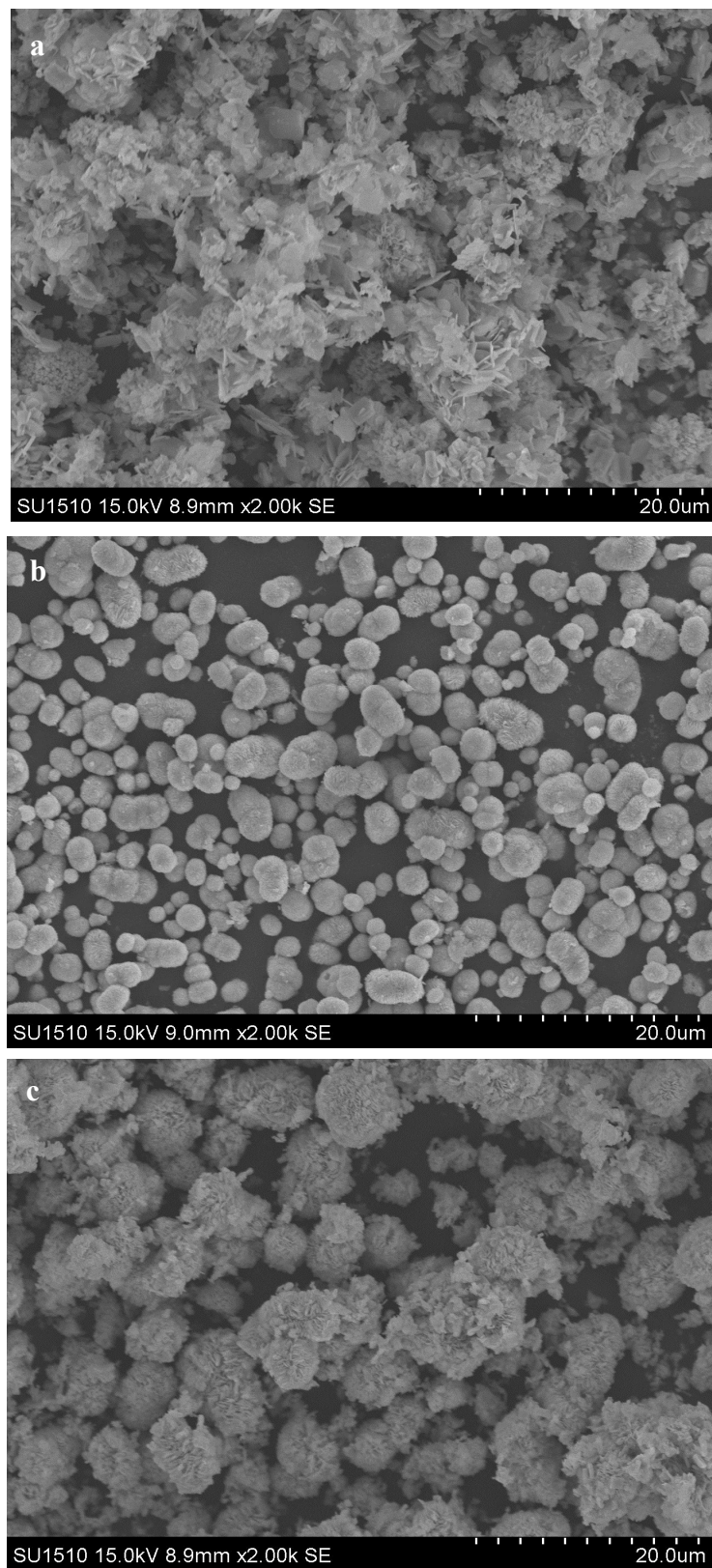
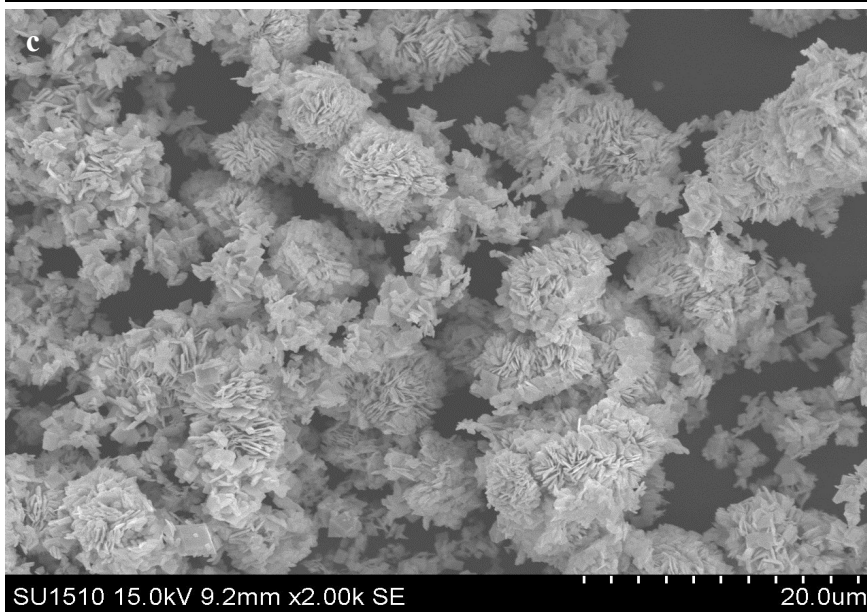
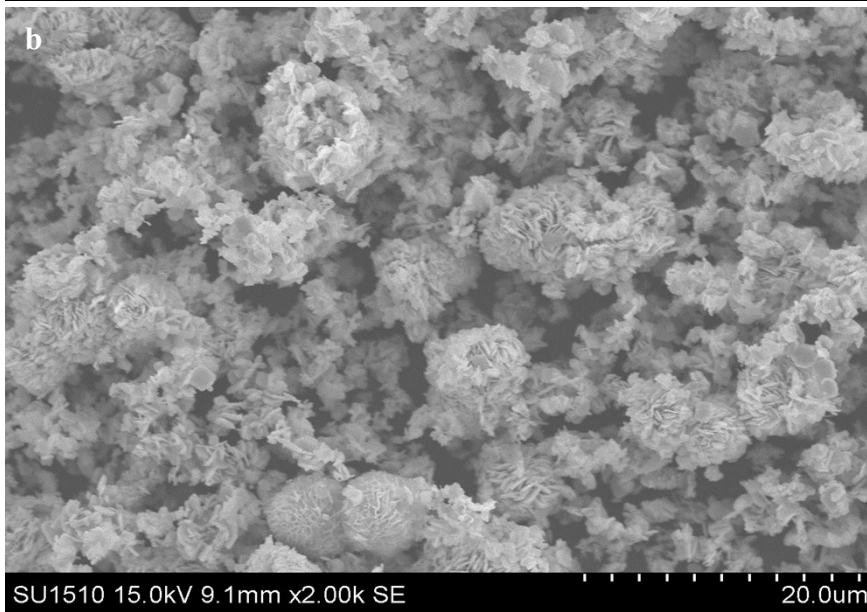
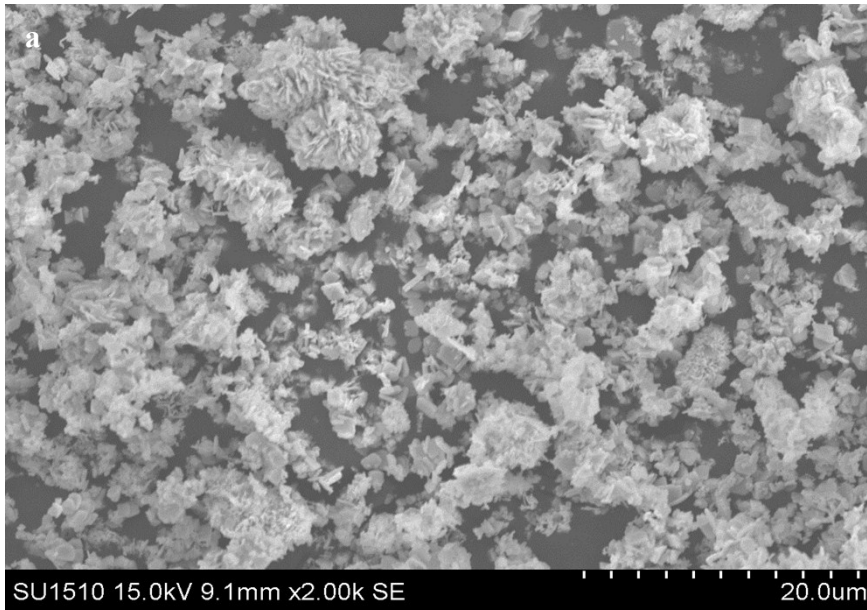


Fig. S6 SEM images of the samples treated using different fluorine sources: (a) NH_4F ; (b) NaF ; (c) HF . Preparation conditions: $R_F = 2$; $V_{\text{Eth}}/V_w = 18/2$.



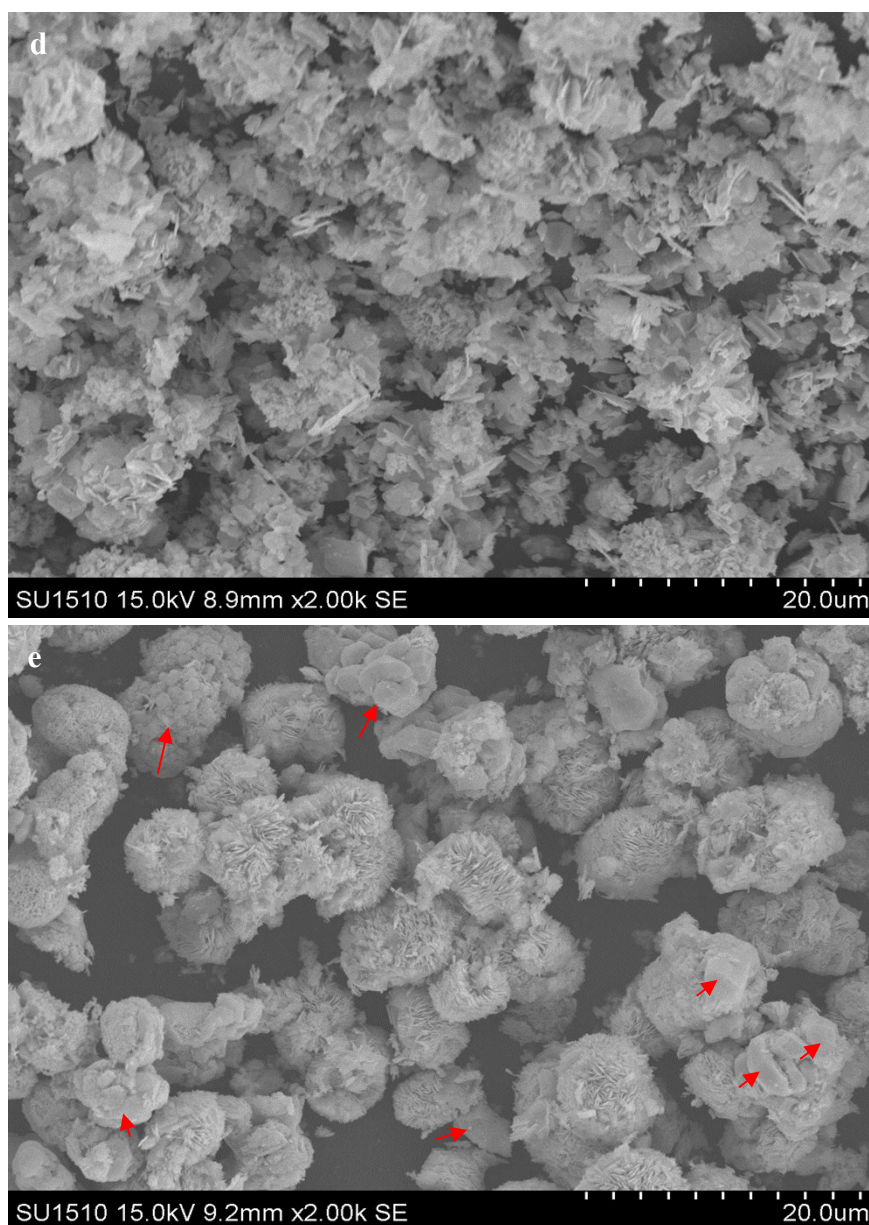


Fig. S7 SEM images of the samples prepared with NH_4F ($R_F=2$) at different volumetric ratios of ethanol to water (V_{Eth}/V_w): (a) 0/20; (b) 2/18; (c) 10/10; (d) 18/2; (e) 20/0.