Facile Synthesis and the Phase Transition Mechanism of Fluoridated Hydroxyapatite with Hierarchical Architecture

Liping Wang[a,b], Ming Wang[a], Yunli Wang[a], Yiran Shao[a], Yingchun Zhu*[a]

[a] Key Laboratory of Inorganic Coating Materials CAS, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai 200050, China

[b] University of Chinese Academy of Sciences, Beijing 100049, China

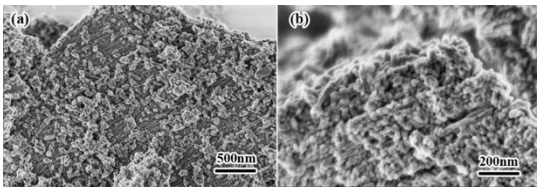

Fig. S1 SEM images of HA nanocrystals synthesized by hydrothermal process at 150℃ for 10 h: (a) oriented HA short rod-like nanoparticles around 100 nm in length are assembled into the plate-like particles in a head-to-tail way; (b) the lateral view shows that HA short-rod nanoparticles are well-organized together[1].

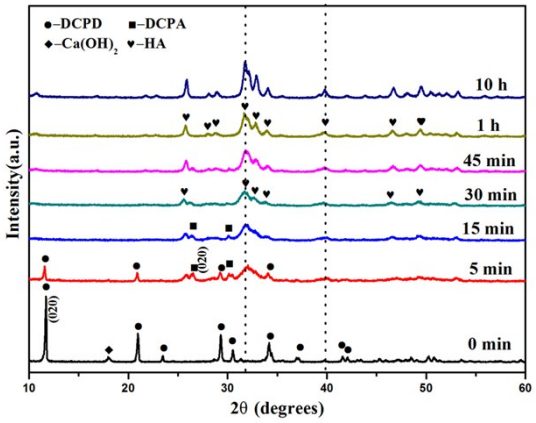

Fig. S2 XRD spectra of 0-min product at room temperature and products of various hydrothermal reaction time (5, 15, 30, 45, 60 min and 10h) at 150℃ when synthesize HA. DCPD is formed at 0 min, DCPA is formed at 5 min and HA is formed at 30 min. The chemical changes have been demonstrated from DCPD to DCPA and further to HA.

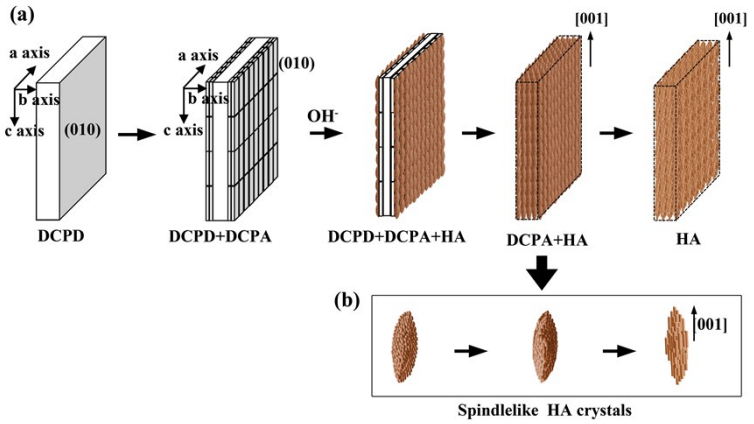

Fig. S3 The crystal growth schematic illustration of (a) hydrothermal process from DCPD to HA; and (b) HA nanocrystal aggregates on the plate surface. [1]

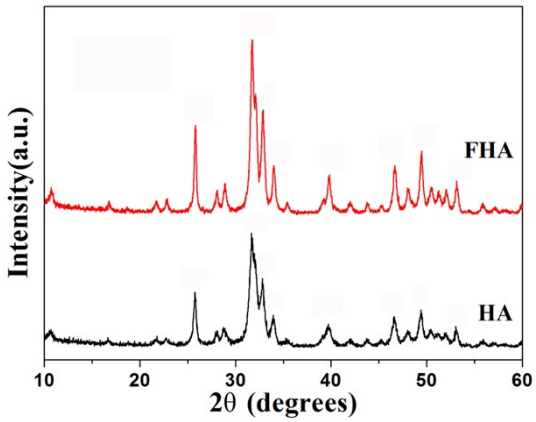

Fig. S4 XRD spectra of 10-h products of HA in Fig. S2 and the FHA in Fig. 1. The peak intensity of FHA is much greater than HA because of the successful introduction of F^- in FHA, demonstrating the successful formation of HA and FHA.

Samples	Lattice constants		Size(Å)
	a-axis(Å)	c-axis(Å)	
HA	9.418	6.884	276
FHA	9.406	6.885	264

Table. S1 The lattice constants, sizes of 10-h products of HA in Fig.S2 and FHA in Fig.1. The reduction of the a-axis and size of cell unit for the product of FHA demonstrate the successful formation of FHA.

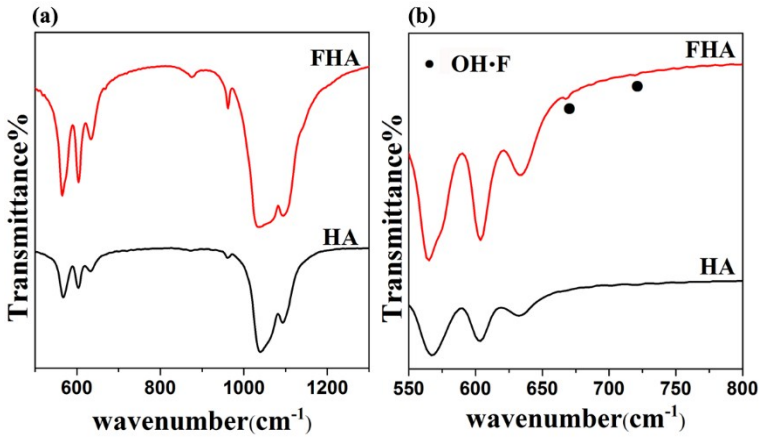

Fig. S5 FTIR spectra of 10-h products of HA and FHA. The peaks of FHA are much stronger than HA as the formation of FHA. Moreover the peaks at 668 and 718 cm^{-1} are assigned to the OH • F hydrogen bonds in FHA.

References

1 Wang, M.; Gao, J.; Shi, C.; Zhu, Y.; Zeng, Y.; Wang, D. *Cryst. Growth Des.* 2014, **14**, 6459-6466.