Supporting information

Synthesis of the Element-substituted Hydroxyapatite with Controllable Morphologies and Chemical Compositions using Calcium Silicate as Precursor

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Table S1. Chemical composition of the synthesized HAp powders after hydrothermal CS in $(NH_4)_3PO_4$ solution.

Sample*	Ratio of the precursor/solution (g : mL)	Element Concentrations of the synthesized HAp powders (wt.%)			
		Na	Si	Ca/P molar ratio	Ca/(P+Si) molar ratio
S4	1 : 85	0.0	0.87	1.68	1.61

* Preparation conditions: the CS powders were mixed with 0.2 M $(NH_4)_3PO_4$ solutions, and then hydrothermal at 180 ^oC for 24 h.

Table S2. Influence of the ratio of the precursor/solution on the Chemical composition of the synthesized HAp powders.

Sample*	Ratio of the precursor/solution (g : mL)	Element Concentrations of the synthesized HAp powders (wt.%)			
		Na	Si	Ca/P molar ratio	(Ca+Na)/(P+Si) molar ratio
S2	1 : 85	1.58	0.89	1.69	1.72
S5	2 : 85	1.37	4.16	1.82	1.49
S6	3 : 85	2.21	8.63	2.38	1.40

* Preparation conditions: the CS powders were mixed with 0.2 M Na_3PO_4 solutions, and then hydrothermal at 180 ^oC for 24 h.

Table S3. Chemical composition of the synthesized HAp powders synthesized from Mg-containing calcium silicate (CMS) precursor.

Sample*	Element Concentrations of the synthesized HAp powders (wt.%)				
	Na	Si	Mg	Ca/P molar ratio	(Ca+Na+Mg)/(P+Si) molar ratio
S7	1.12	3.89	2.80	1.87	1.65

*Preparation conditions: the 1g CMS powders were mixed with 85 mL 0.2 M Na_3PO_4 solutions, and then hydrothermal at 180 ^oC for 24 h.

Table S4. Chemical composition of the synthesized HAp powders synthesized from Sr-containing calcium silicate (Sr_X-CS) precursors.

Sample*	Precursors	Element Concentrations of the synthesized HAp powders (wt.%)				
		Na	Si	Sr	Ca/P molar ratio	(Ca+Na+Sr)/(P+Si) molar ratio
S8	Sr_5-CS	1.48	1.30	1.48	1.75	1.75
S9	Sr_{10}-CS	1.47	1.54	3.35	1.75	1.75
S10	Sr_{20}-CS	1.45	1.72	6.98	1.59	1.68

* Preparation conditions: ratio of the precursor/solution =1g : 85 mL; using Na_3PO_4 solutions as phosphorus source; hydrothermal at 180 ^oC for 24 h.

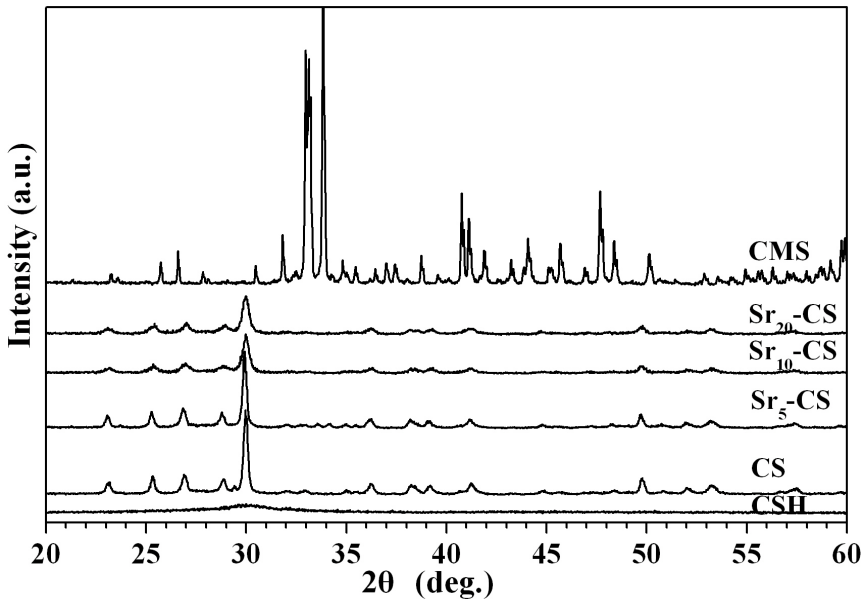

Fig. S1. XRD patterns of calcium silicate precursors for CSH, CS, Sr_5-CS, Sr_{10}-CS, Sr_{20}-CS and CMS. No impurities could be found in the synthetic calcium silicate precursors.

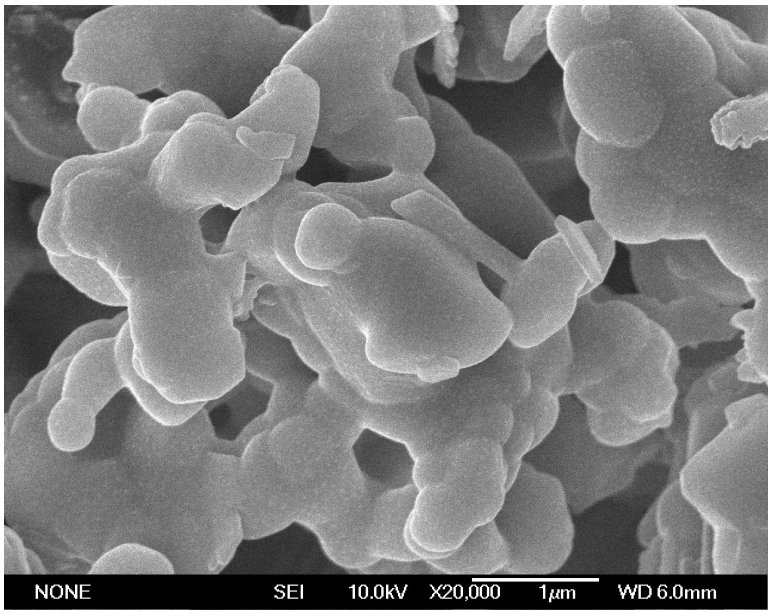

Fig. S2. FESEM image of the CS powders. The result shows that the powder size is in the range of 0.5-1 μm.

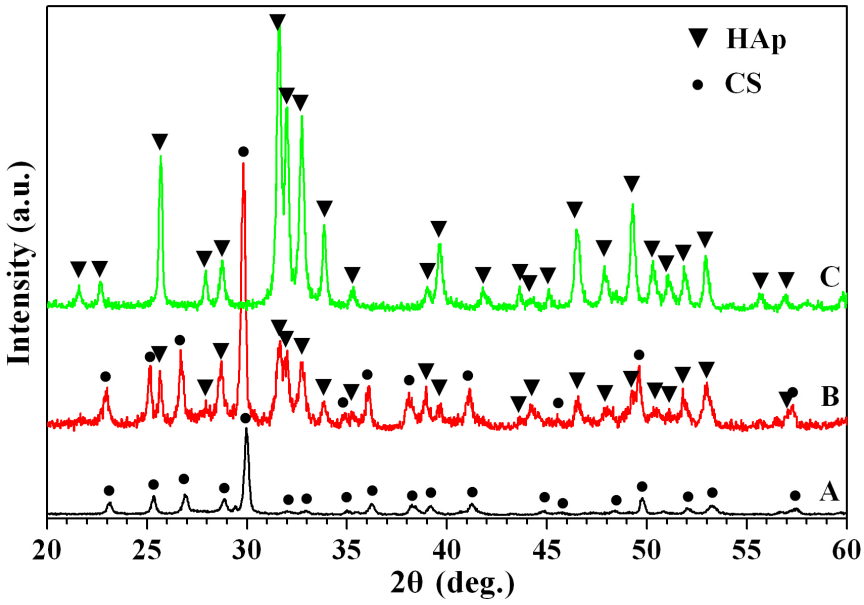

Fig. S3. XRD patterns of CS precursor (A) and after hydrothermal of CS precursor in Na_3PO_4 at 180 ^oC for 1 h (B) and 3 h (C).

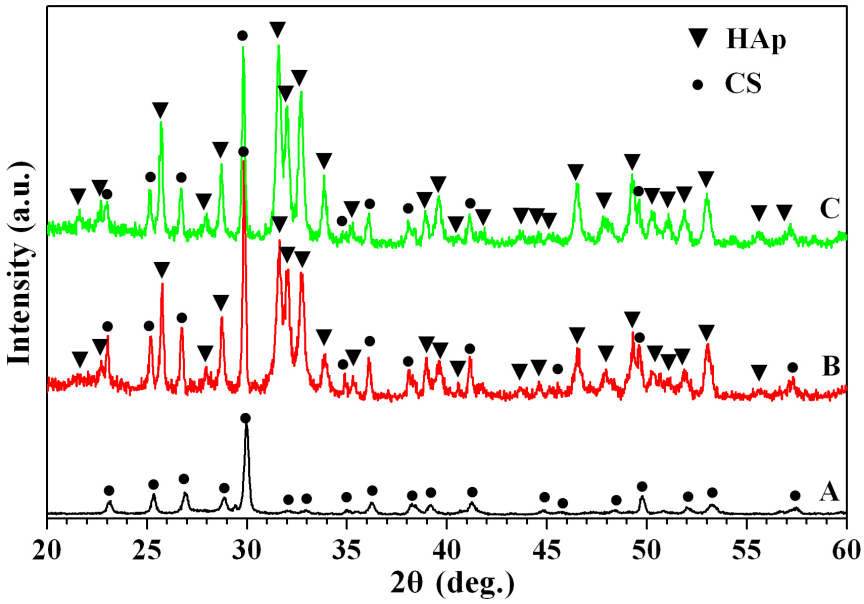

Fig. S4. XRD patterns of CS precursor (A) and after hydrothermal of CS precursor in NaH_2PO_4 at 180 ^oC for 1 h (B) and 3 h (C).