Electronic supplementary information

Appropriate regulation of magnesium on hydroxyapatite crystallization in simulated body fluids

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Tables

Table S1. The composition of simulated body fluid (SBF).

Ion.	**Na^+**	**K^+**	**Mg^{2+}**	**Cl^-**	**SO_4^{2-}**	**Ca^{2+}**	**HPO_4^{2-}**	**HEPES**
C/mM	140	5.0	0-1.5	148-151	0.5	5.0	3.0	10.0

Table S2. The chemical analysis of Mg in ACP and HAP in the presence of different Mg^{2+} concentrations in SBF solution, or adding 0.5 mM Mg^{2+} at different reaction times.

Group	Mg/Ca molar ration in ACP (mean ± s.d.)	Mg/Ca molar ration in HAP (mean ± s.d.)
0.2 mM Mg	0.019 ± 0.004	0.017 ± 0.002
0.5 mM Mg	0.032 ± 0.002	0.029 ± 0.002
1.0 mM Mg	0.058 ± 0.005	0.040 ± 0.005
1.5 mM Mg	0.070 ± 0.005	0.047 ± 0.003
adding(0)	0.032 ± 0.002	0.029 ± 0.002
adding(5)	0.013 ± 0.001	0.032 ± 0.001
adding(10)	0.010 ± 0.001	0.028 ± 0.001
adding(15)	0.008 ± 0.002	0.028 ± 0.002

Table S3. The (002) d-spacing, *c* lattice parameter, and lattice distortion of HAP and Mg-doped HAP. The shrinkage of the *c* lattice (lattice distortion) is calculated by [*c*(Mg) - *c*(control)] / *c*(control) × 100%.

	2θ(002) (deg.)	(002) d-space (nm)	c lattice parameter (nm)	lattice distortion (%)
HAP (control)	25.889	0.3438	0.6875	control
0.2 mM Mg^{2+}	25.911	0.3434	0.6869	-0.09
0.5 mM Mg^{2+}	25.924	0.3433	0.6866	-0.13
1.0 mM Mg^{2+}	25.938	0.3431	0.6863	-0.18
1.5 mM Mg^{2+}	25.978	0.3425	0.6850	-0.36

Figures

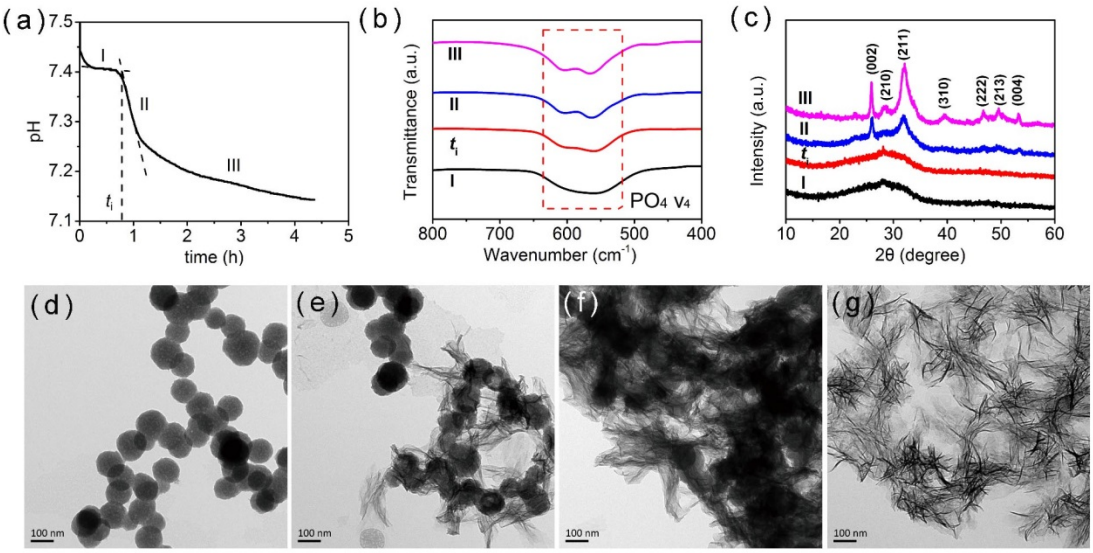

Fig. S1 HAP crystallization process in the SBF solution with 0.5 mM Mg^{2+}. (a) A typical pH curve; FTIR (b), XRD (c), and TEM (d-g) characterization of mineral formed in stage I, t_i (induction time), II, and III.

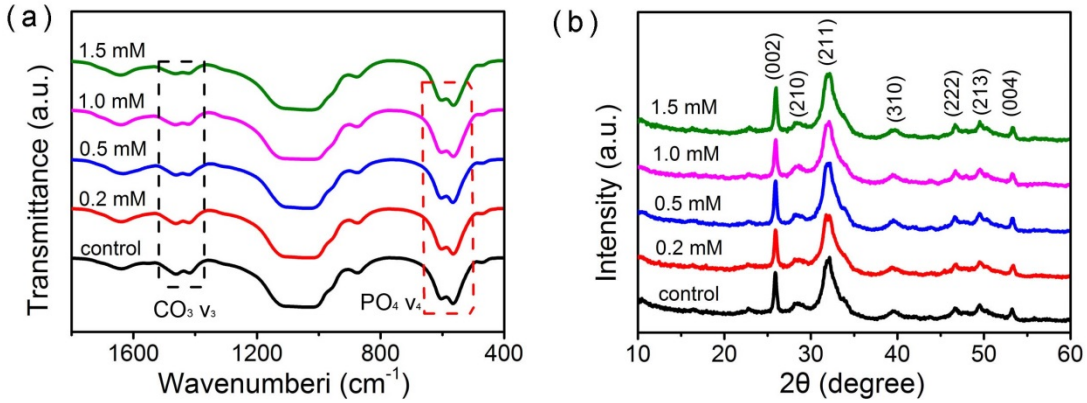

Fig. S2 FTIR (a) and XRD (b) characterization of final minerals formed at different Mg^{2+} concentrations.

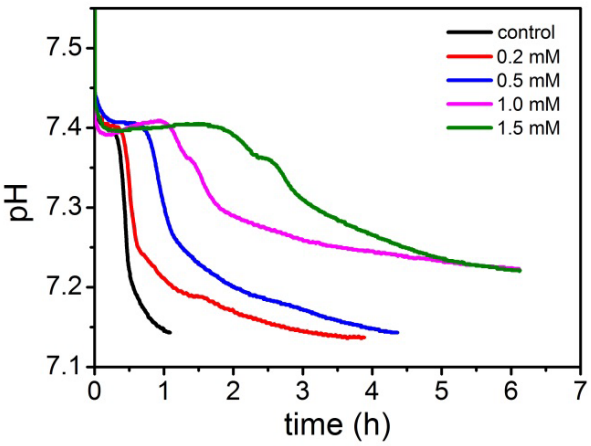

Fig. S3 The pH curves of SBF solution by adding different Mg^{2+} concentrations.

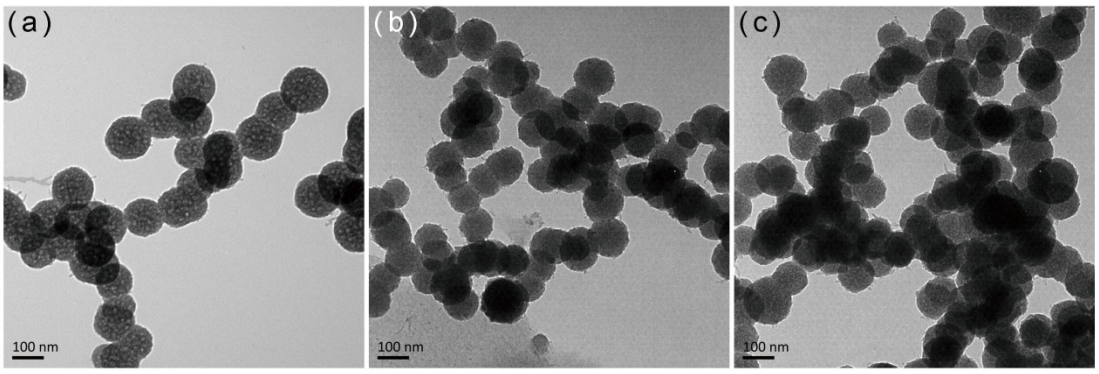

Fig. S4 The morphology of ACP formed at different reaction times at induction period (in stage I) in control group. (a) 5 min; (b) 10 min; (c) 15 min.

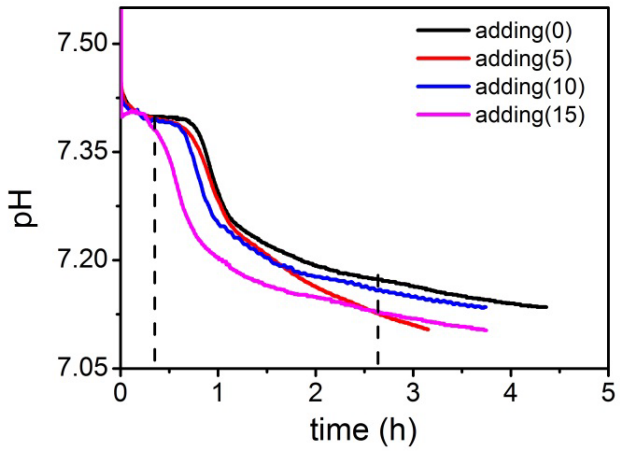

Fig. S5 The pH curves of SBF solution by adding 0.5 mM Mg^{2+} at different reaction times.

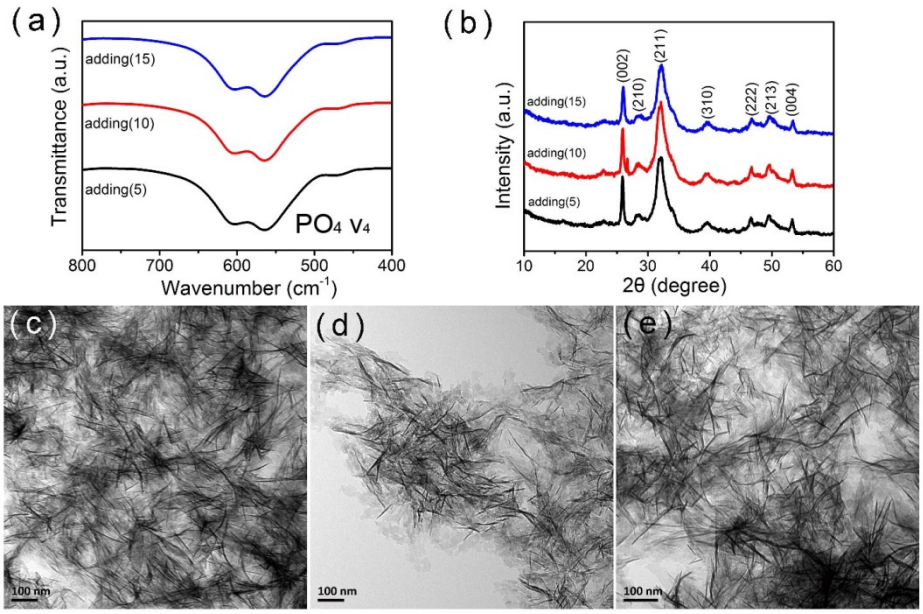

Fig. S6 FTIR (a), XRD (b), and TEM (c-e) characterization of final minerals formed by adding Mg^{2+} after ACP formation at 5 min, 10 min and 15 min.

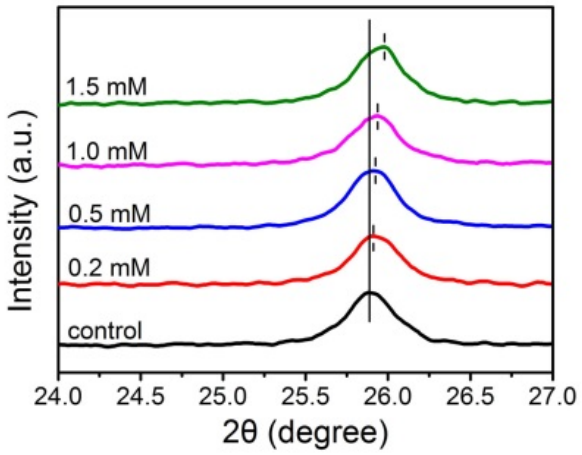

Fig. S7 The enlarged view of (002) diffraction peak in XRD patterns (Fig. S2b†). The (002) diffraction angle is slightly increased with the increasing Mg^{2+} concentration.

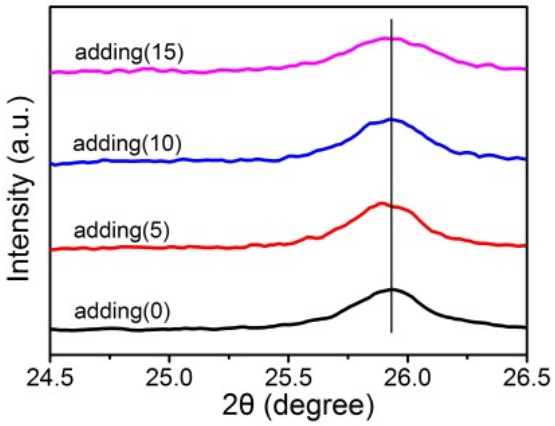

Fig. S8 The enlarged view of (002) diffraction peak in XRD patterns (Fig. S2b† and Fig. S6b†). The (002) diffraction angle is not evident change when adding 0.5 mM Mg^{2+} at different reaction times.

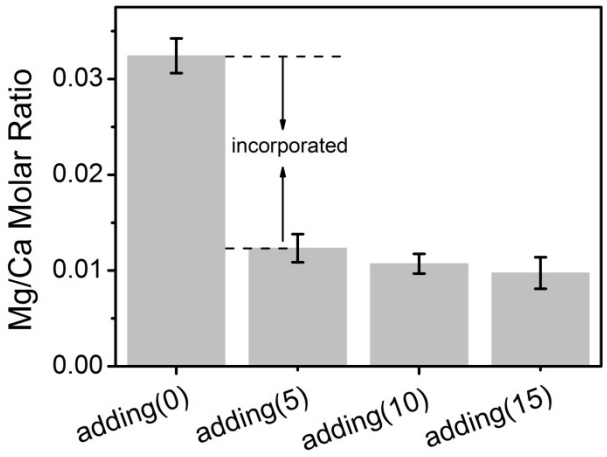

Fig. S9 The change of Mg^{2+} concent in ACP by adding 0.5 mM Mg^{2+} at different reaction times.

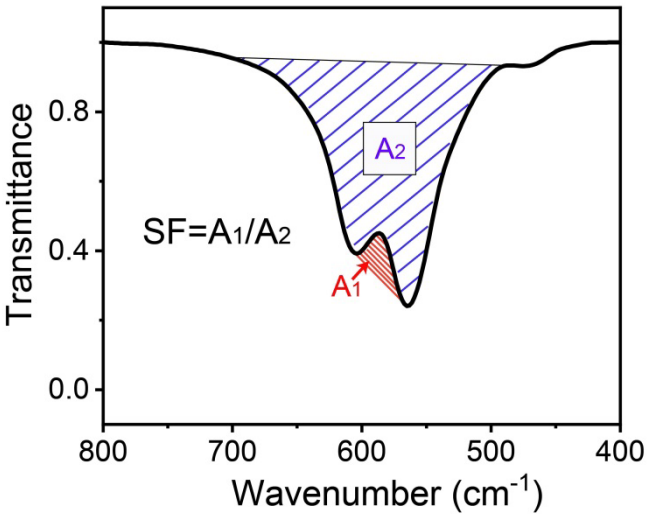

Fig. S10 Scheme of the calculation of splitting function (SF). A_1 is the area enclosed by the spectrum and the straight line and A_2 is the area enclosed by spectrum and straight baseline, the SF is defined as the radio of A_1 to A_2. SF is used as the crystallization indicator of calcium phosphate.