SUPPLEMENTARY MATERIAL

Article: Morphology control of hydroxyapatite as a potential reinforcement for orthopedic biomaterials: The hydrothermal process.

Piotr Szterner*, Agnieszka Antosik, Joanna Pagacz and Paulina Tymowicz-Grzyb

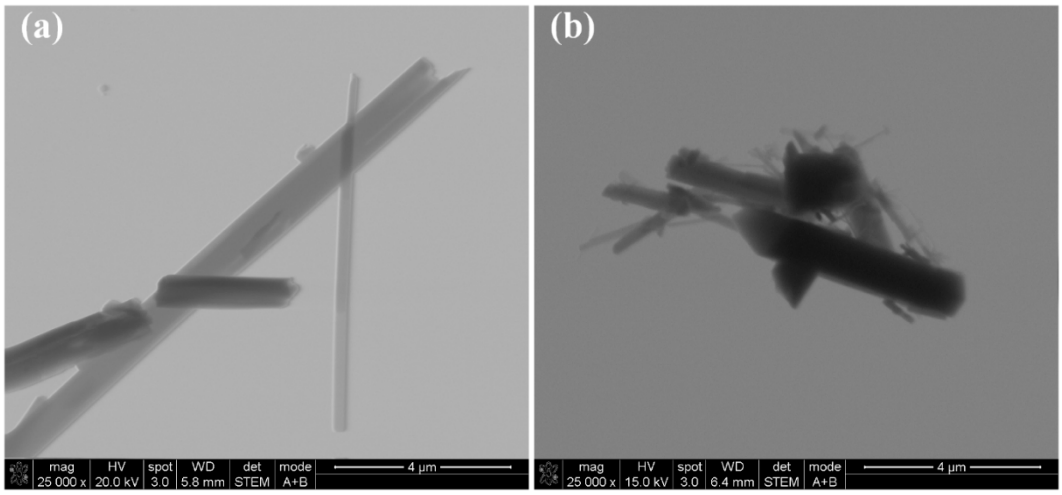

Figure S1. STEM images of products obtained in hydrothermal synthesis (200 °C, 20 bar, 5 h) for (a) whiskers Ca^{2+} ion concentration 0.05 mol/dm^3, and (b) hexagonal rods Ca^{2+} ion concentration 0.2 mol/dm^3.

The STEM images of whiskers and hexagonal rods obtained during 5 hours of synthesis are shown in Figure S1. It is possible to observe that whiskers and hexagonal rods are characterized by smooth surface and clear contours.

Table S1. IR bands assignments for hydroxyapatites under investigation (vw-very weak, w-weak, sh-shoulder) [52,53].

Band assignment	Ca^{2+} concentration (mol/dm^3) and reaction time						
	5h					1h	
	0.025	**0.05**	**0.1**	**0.15**	**0.2**	**0.05**	**0.2**
OH surface	3571	3571	3571	3570	3570	3571	3571
water	3415	3408	3468/3402	3468/3400	3467/3408	3397	3467/3413
CH_3,CH_2	2971/2933/2882w	2972/2932	2971/2929	2971/2927	2970/2924	2970/2928	2970/2931/2881
Overtones CO_3^{2-} and ν_3/ν_1 PO_4	2002/1988	2002/1989	2002/1989	2002/1989	2002/1988	2002/1990	2002/1988
Water O-H	1631	1631	1630 w	1635vw	1630	1630	1630
P=O str.	1210/1143	1210 sh	~1210 vw	–	–	1206/1143sh	1143sh
ν3 asym. PO_4^{3-}	1105/1090	1109/1092	1093	1092	1093	1098	1093
ν3 asym. PO_4^{3-} ideal crystal	1031	1031	1046/1020	1047/1023	1048/1023	1031	1048/1026
asym. str. P-O	963	962	961	961	961	963	962
CO_3^{2-}	872	872	876	878	~878sh	867*	876
$P_2O_7^{4-}$	729w	729vw	733vw	726vw	726vw	730vw	731vw
str. OH^- labile PO_4^{3-}	634	635	633	633	633	634	633
603+562+473 ν_4 str. PO_4^{3-}	603	602	603	603	603	603	603
	563	563	563	562	562	562	562
	473	473	473	473	473	473	473
H_2PO^{4-}, or $P_2O_7^{4-}$	427	~427vw	~427vw	–	~427vw	~429vw	425

Table S2. Effect of the synthesis temperature and the pressure on the lattice parameters of the phases present in the synthesized powders (reaction conditions: Ca^{2+} 0.05 mol/dm^3, 200°C, 5 h, 250 rpm).

temperature (°C)	pressure (bar)	phase composition	COD	system	space group	crystal lattice parameters			
						a (Å)	b (Å)	c (Å)	V* (Å^3)
200	20	HAp	9002214 [50]	hexagonal	P 63/m	9.43940	9.43940	6.88610	531.36
170	10	HAp	9011092 [49]	hexagonal	P 63/m	9.42400	9.42400	6.87900	529.09
150	6	HAp	9011092 [49]	hexagonal	P 63/m	9.42400	9.42400	6.87900	529.09
130	4	HAp	9001233 [48]	hexagonal	P 63/m	9.41660	9.41660	6.87450	527.91
110	2	HAp	9001233 [48]	hexagonal	P 63/m	9.41660	9.41660	6.87450	527.91
		DCPA	9007619 [51]	triclinic	P1	6.91	6.627	6.99800	309.28

*cell volume.

Table S3. Effect of the stirring rate on the lattice parameters of the phases present in the synthesized powders (reaction conditions: Ca^{2+} 0.05 mol/dm^3, 200 °C, 5 h, 20 bar).

Stirring rate (rpm)	phase composition	COD	crystal lattice parameters		
			a=b (Å)	c (Å)	V* (Å^3)
1000	HAp	9001233 [48]	9.41660	6.87450	527.91
750	HAp	9001233 [48]	9.41660	6.87450	527.91
250	HAp	9011092 [49]	9.42400	6.87900	529.09
125	HAp	9011092 [49]	9.42400	6.87900	529.09
62.5	HAp	9002214 [50]	9.43940	6.88610	531.36
0	HAp	9002214 [50]	9.43940	6.88610	531.36

*cell volume.