Flow-driven synthesis of calcium phosphate–calcium alginate hybrid chemical gardens Electronic Supplementary Material

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EXPERIMENTAL

Density and dynamic viscosity:

The density of reactants was measured using a density meter (Anton Paar DMA-500) and the viscosity of 500 mL of solution with a rotational viscometer (Anton Paar ViscoQC-300).

Table S1. (A) Concentrations and densities of $CaCl_2$ solution and (B) concentrations of Na_3PO_4 and solution densities of homogeneous solution of PO_4^{3-} in 0.3 w/V% sodium alginate.

(A)	$[CaCl_2]$/ M	0.07	0.34	0.68	1.36	2.04		
	$\rho_{Ca^{2+}}$ / g cm^{-3}	1.0032	1.0267	1.0551	1.1048	1.1527		
(B)	$[Na_3PO_4]$/ mM	0	2.63	13.1	26.3	65.8	131.5	263
	ρ_{O_I} / g cm^{-3}	0.9982	0.9989	1.0009	1.0037	1.0110	1.0239	1.0467
	η_{O_I} / mPa s	25.0	–	–	–	–	–	8.0

Raman spectroscopy:

Raman-spectroscopy measurements were carried out using a SENTERRA II Compact Raman microscope ($\lambda_{exc} = 785$ nm, $P = 25$ mW).

SUPPORTING FIGURES

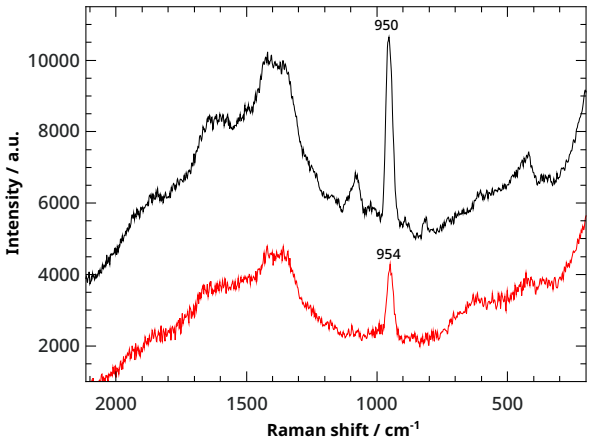

Figure S1. Raman-spectra of dried samples with composition of $[Na_3PO_4]$ = 26.3 mM (red) and 0.263 M (black) in 0.3 w/V% alginate. In all cases $[CaCl_2]$ = 2.04 M.

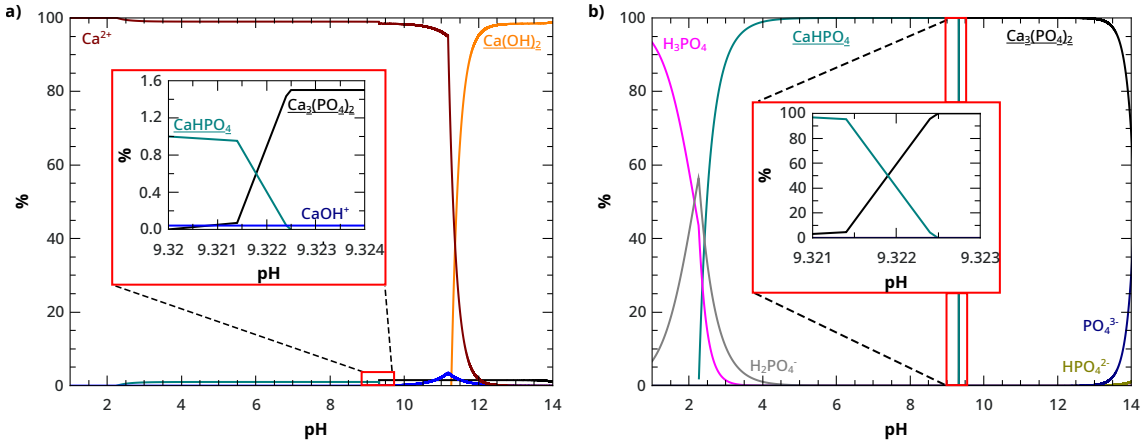

Figure S2. Percentage distribution of (a) Ca^{2+} and (b) PO_4^{3-} containing species using $c_{T,\mathrm{Ca}}$ = 2.0 M and $c_{T,\mathrm{PO_4}}$ = 26.3 mM concentrations.

SUPPORTING TABLES

Table S2. Tube diameter at different $CaCl_2$ concentrations and injection rates.

	$Q = 2.48$ mL min^{-1}	$Q = 3.35$ mL min^{-1}
[$CaCl_2$] / M	d / mm	d / mm
0.34	0.93 ± 0.02	0.94 ± 0.05
0.68	0.96 ± 0.03	0.93 ± 0.07
1.36	0.87 ± 0.04	0.93 ± 0.08
2.04	0.83 ± 0.04	0.89 ± 0.08

Table S3. Equilibrium constants for the calculations.

pK_{sp1}	18.92
pK_{sp2}	6.58
pK_{sp3}	5.19
$logK_{H1}$	12.35
$logK_{H2}$	7.199
$logK_{H3}$	2.148
$log\beta_1$	1.30