Supporting Information

Bacterially mediated morphogenesis of struvite and its implication for phosphorus recovery

Han Li[1], Qi-Zhi Yao[2*], Sheng-Hui Yu[1], Ya-Rong Huang[1], Xiang-Dong Chen[3], Sheng-Quan Fu[4], Gen-Tao Zhou[1*]

[1] CAS Key Laboratory of Crust-Mantle Materials and Environments, School of Earth and Space Sciences, University of Science and Technology of China, Hefei 230026, P. R. China.

[2] School of Chemistry and Materials Science, University of Science and Technology of China, Hefei 230026, P. R. China.

[3] State Key Laboratory of Virology, College of Life Sciences, Wuhan University, Wuhan 430072, P. R.China

[4] Hefei National Laboratory for Physical Sciences at Microscale, University of Science and Technology of China, Hefei 230026, P. R. China.

- Corresponding author：Prof. Dr. Gen-Tao Zhou

Email: gtzhou@ustc.edu.cn

Tel.: 86 551 63600533

Fax: 86 551 63600533

Table S1. Binding Energies (eV) and Assignment/Quantization of XPS Spectral Bands

Element	C					O		N	
Percentage	9.97					38.84		3.60	
Peak(eV)	284.5	285.1	286.1	287.2	288.1	531.2	532.3	399.9	401.2
Assignment	C-C C-H	C-N	C-OH C-O-C	C=O	O-C=O	O=C O-C=O	C-OH C-O-C	N_{nonpr}	N_{pr}
Percentage	4.74	0.89	2.53	0.54	1.27	23.65	15.19	1.06	2.54

The C 1s peak was resolved into five component peaks, i.e., the peak at 284.5 eV (4.74%) can correspond to the C-(C/H) from lipids or amino acid side chains, the peak at 286.1 eV (2.53%) to C-OH or C-O-C from alcohol, ether, or phenol, the peaks at 285.1 (0.89%), 287.2 (0.54%) and 288.1 eV (1.27%) to C-N from amine or amide, C=O from carbonyl, O-C=O from carboxylic acid, carboxylate, or ester, respectively (e.g., Badireddy et al., 2008; Yuan et al., 2011; Yin et al., 2015). The O 1s peak at 531.2 eV (23.65%) can be attributed to C=O or O-C=O from carboxylic acid, carboxylate, carbonyl, or amide (Sun et al., 2009; Yuan et al., 2011). The second O 1s peak at 532.3 eV (15.19%) is associated with C-OH or C-O-C from alcohol, acetal, and hemiacetal (Sun et al., 2009; Yuan et al., 2011). The N 1s peak at 399.9 eV can be assigned to nonprotonated nitrogen (N_{nonpr}, 1.06%) from amines and amides, whereas another peak at 401.2 eV to protonated amines (N_{pr}, 2.54%) from amino acids or aminosugars (Yuan et al., 2011; Yin et al., 2015).

Table S2. The analysis results of amino acids (mg/L)

Amino acids	Asp	Thr	Ser	Glu	Gly	Ala	Cys	Val	Pro	Met	Ile	Leu	Tyr	Phe	Lys	His	Arg
Uninoculated culture medium	96.15	116.15	128.85	329.2	56.25	182.95	29.6	177.25	28.65	108.05	123.25	651.45	137.9	330.6	459.55	41.2	304.3
LMW component solution	5.6	1.5	8.65	12.5	37.95	215.05	55.45	141.55	219.9	129.85	7.65	9.6	181.9	342.7	389.8	4.2	17.15

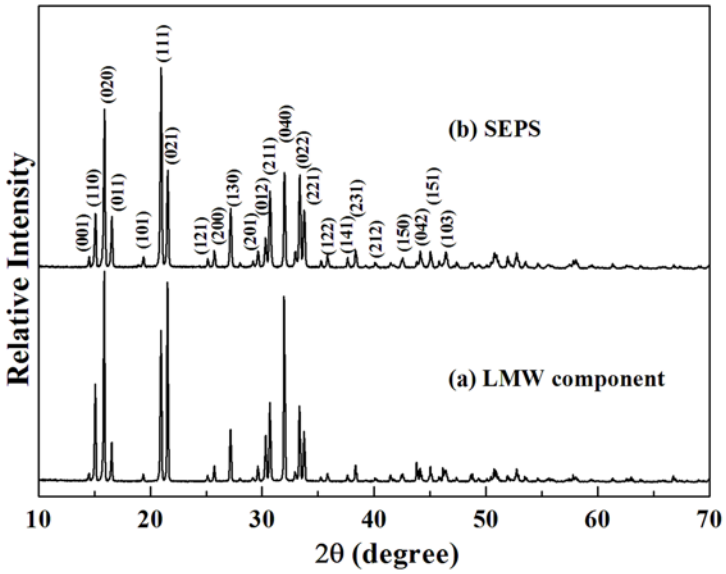

Figure S1. XRD patterns of the samples synthesized for 3 h in the (a) LMW component solution and (b) SEPS solution.

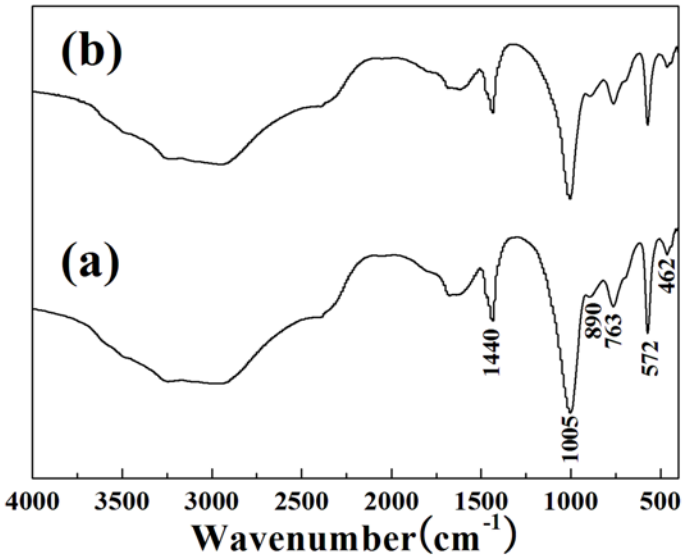

Figure S2. FT-IR spectrum of the sample synthesized for 3 h in the LMW component solution (a) and deionized water (b).

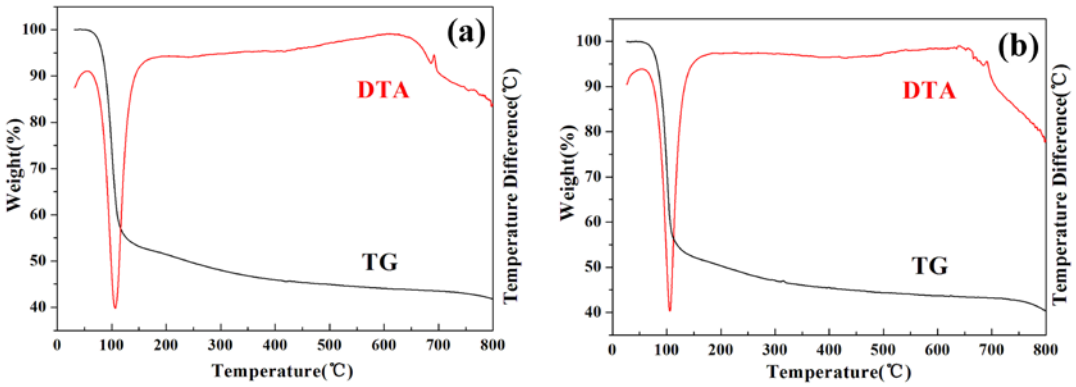

Figure S3. TG-DTA curves of the sample synthesized for 3 h in the LMW component solution (a) and deionized water (b).

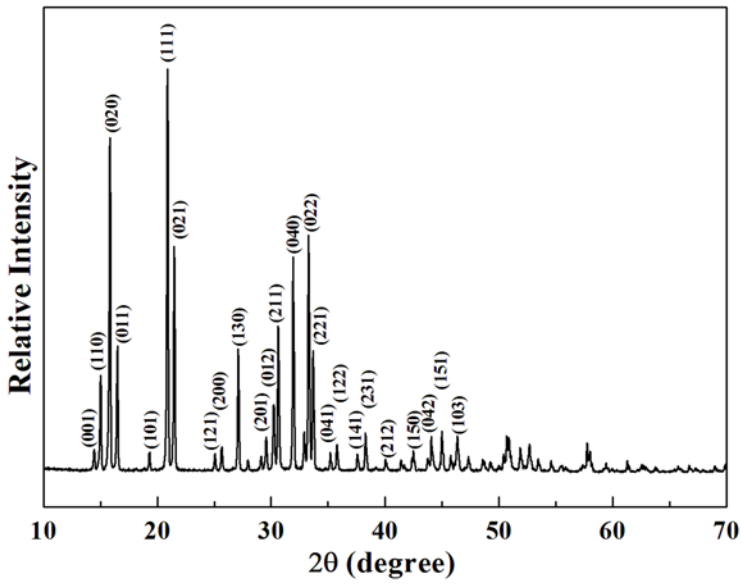

Figure S4. XRD pattern of the sample synthesized for 3 h in the BEPS solution.

Supplementary references

Badireddy, A.R., Korpol, B.R., Chellam, S., Gassman, P.L., Engelhard, M.H., Lea, A.S., and Rosso, K.M. (2008) Spectroscopic characterization of extracellular polymeric substances from *Escherichia coli* and *Serratia marcescens*: Suppression using sub-inhibitory concentrations of bismuth thiols. Biomacromolecules, 9, 3079-3089.

Sun, X.F., Wang, S.G., Zhang, X.M., Chen, J.P., Li, X.M., Gao, B.Y., and Ma, Y. (2009) Spectroscopic study of Zn^{2+} and Co^{2+} binding to extracellular polymeric substances (EPS) from aerobic granules. Journal of Colloid and Interface Science, 335, 11-17.

Yin, C.Q., Meng, F.G., and Chen, G.H. (2015) Spectroscopic characterization of extracellular polymeric substances from a mixed culture dominated by ammonia-oxidizing bacteria. Water Research, 68, 740-749.

Yuan, S.J., Sun, M., Sheng, G.P., Li, Y., Li, W.W., Yao, R.S., and Yu, H.Q. (2011) Identification of key constituents and structure of the extracellular polymeric substances excreted by *Bacillus megaterium* TF10 for their flocculation capacity. Environmental Science & Technology, 45, 1152-1157.