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Supplementary Information

Recognition on the Key Chemical Constituents of Sewage Sludge for Biogas Production

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Table S1. Basic constituents of the synthetic wastewater in this study

Compounds	Concentration (mg/L)
Sodium acetate (NaCOOH)	150-200
Glucose ($C_6H_{12}O_6$)	350-400
Sucrose	350-400
Starch	350-400
Bovine Serum Albumin (BSA)	150-200
Ammonia chloride (NH_4Cl)	400-450
Potassium phosphate (KH_2PO_4)	140-150
Calcium chloride ($CaCl_2 \cdot 2H_2O$)	0.47
Magnesium sulfate ($MgSO_4 \cdot 7H_2O$)	5
Manganese chloride ($MnCl_2 \cdot 4H_2O$)	0.28
Zinc sulfate ($ZnSO_4 \cdot 7H_2O$)	0.45
Ferric chloride anhydrous ($FeCl_3$)	1.45
Cupric sulfate ($CuSO_4 \cdot 5H_2O$)	0.4
Cobalt chloride ($CoCl_2 \cdot 6H_2O$)	0.4

Table S2. The basic parameters of different sludge samples in the BMP tests

Sludge Samples	VS (%TS)	TS (%)	Additions (g/200g MS)		
			HM	$FeCl_3$	Silica
Seed Sludge	47.0 ± 0.3	2.3 ± 0.2	/	/	/
SS	72.3 ± 1.5	4.1 ± 0.2	/	/	/
MS	90.2 ± 2.1	1.2 ± 0.3	/	/	/
MS-M	81.5 ± 0.3	1.3 ± 0.1	/	0.250	/
MS-Silica	77.1 ± 0.1	1.4 ± 0.1	/	/	0.630
MS-HM	90.5 ± 0.2	1.4 ± 0.1	0.375	/	/
MS-HM-M	84.5 ± 0.1	1.5 ± 0.1	0.375	0.250	/
MS-HM-Silica	74.6 ± 0.2	1.7 ± 0.2	0.375	/	0.630
MS-HM-M-Silica	70.4 ± 0.2	1.8 ± 0.2	0.375	0.250	0.630

TS: total solids; VS: volatile solids;

Text S1. The context of the Micron-sized silica particles

In this paper, the median particle size of Micron-sized silica particle is about 30 um, according to the analysis of the silts in sewage sludge in China. [1, 2]

[1] Yuxin Zhao. Investigation on the properties of sewage sludge of WWTPs in China and Experiments on sand removal of sludge. Master's Thesis, 2014. (in Chinese)

[2] Xiaohu Dai, Yuxin Zhao, Sha Chao etc. Investigation on the status and causes of sludge sand content of wastewater treatment plants in China. Water & Wastewater Engineering, 2014, 40, 75-79. (in Chinese)

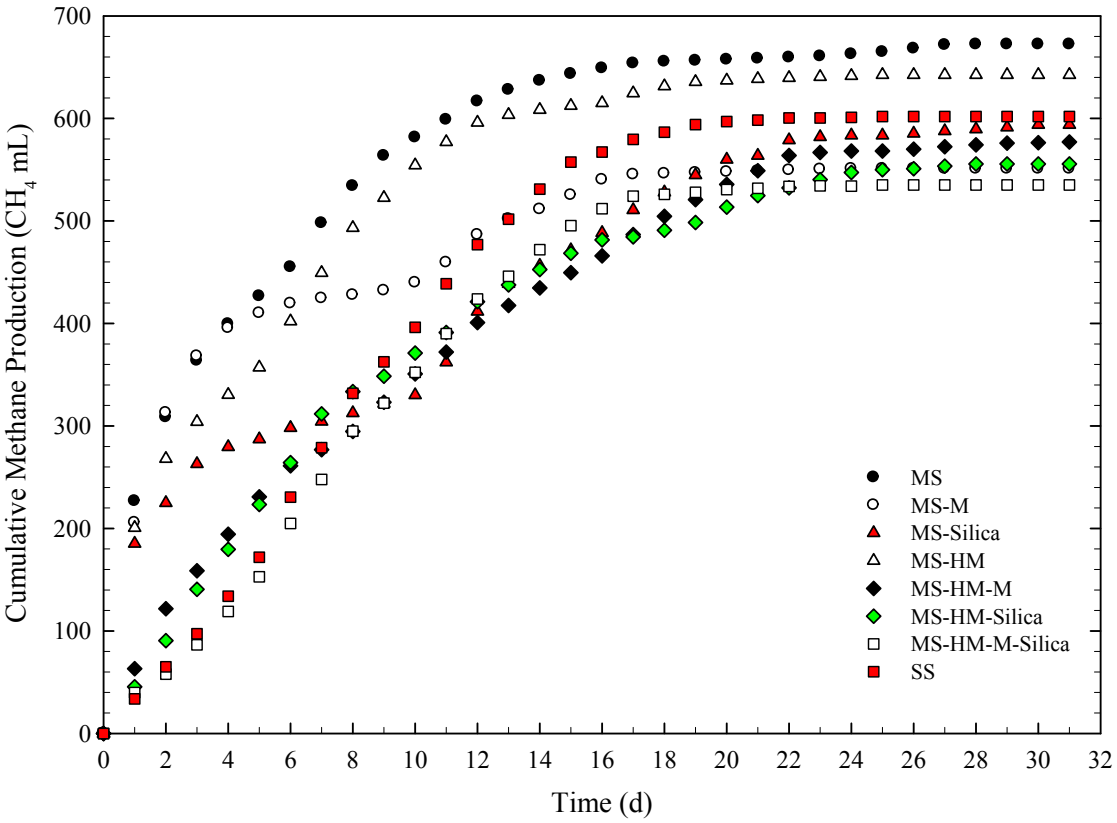

Figure S1. Cumulative methane production for different sludge samples (Methane production from only the inoculum was subtracted from total methane production)

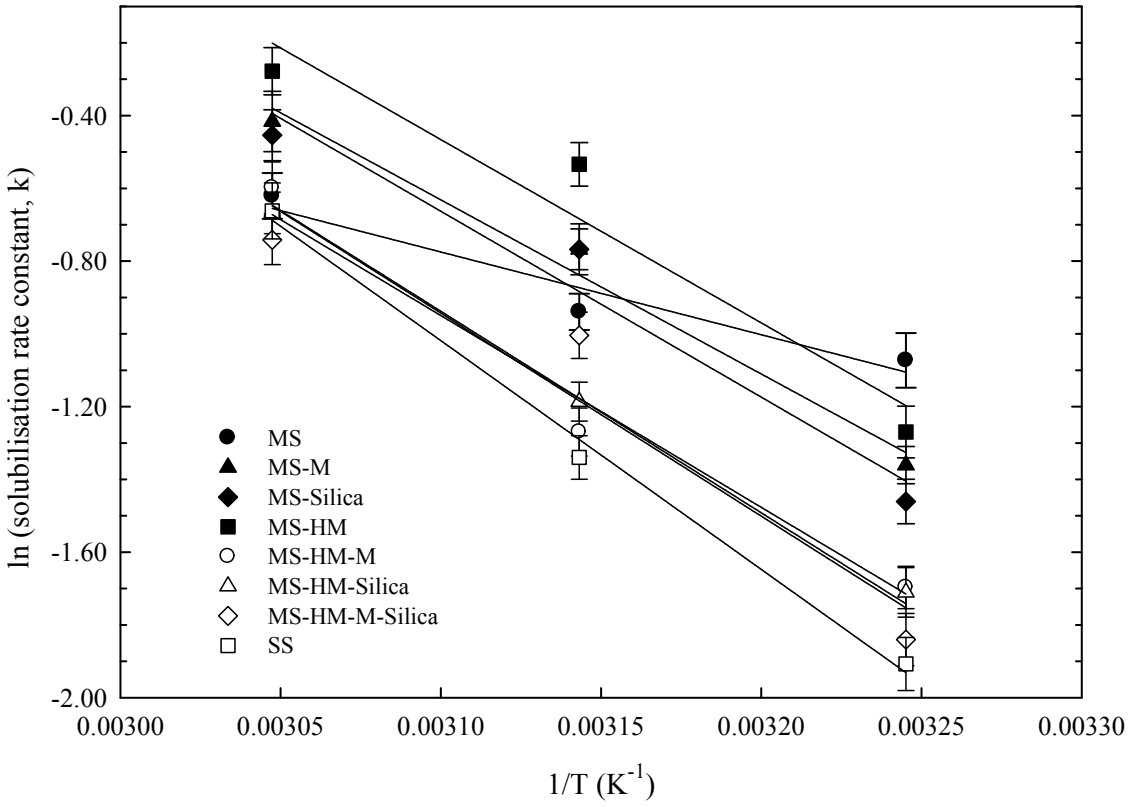

Figure S2. Arrhenius plots of different sludge samples