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Supplementary information

Biomethanation of blast furnace gas using anaerobic granular sludge via addition of hydrogen

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Table. S1 The experimental conditions of methanogenic potential of AGS

Runs	Methanogenic activities	Sodium acetate (mM)	The volume of gas (ml)			Total pressure (supplied by N_2)(atm)
			CO	CO_2	H_2	
R0	Control	-	-	-	-	
R1	Acetoclastic	30	-	-	-	1
R2	Hydrogenotrophic	-	-	30	120	2.5
R3	Carboxydotrophic-a	-	12	-	-	1
R4	-	-	12	-	38.4	1
R5	Carboxydotrophic-b	-	12	9.6	38.4	1

Table. S2 The experimental conditions about effect of exogenous H_2 partial pressures on methane production from blast furnace gas.

H_2 partial pressure (atm)	The volume of gas (ml)			Total pressure (supplied by N_2)(atm)
	CO	CO_2	H_2	
0.04	13.2	13.2	2.4	
0.88	13.2	13.2	52.8	2.6
1.54	13.2	13.2	92.4	

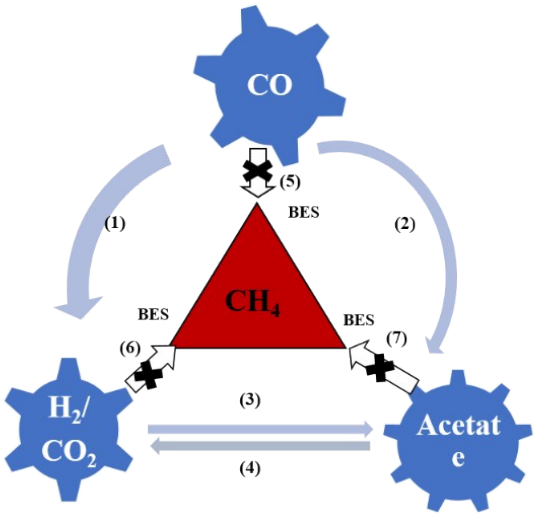

Fig. S1 Pathways from CO to CH_4 in the presence of BES: (1) carboxydotrophic hydrogenogenesis, (2) carboxydotrophic acetogenesis, (3) homoacetogenesis, (4) syntrophic acetate oxidation, (5) carboxydotrophic methanogenesis, (6) hydrogenotrophic methanogenesis, and (7) acetoclastic methanogenesis.

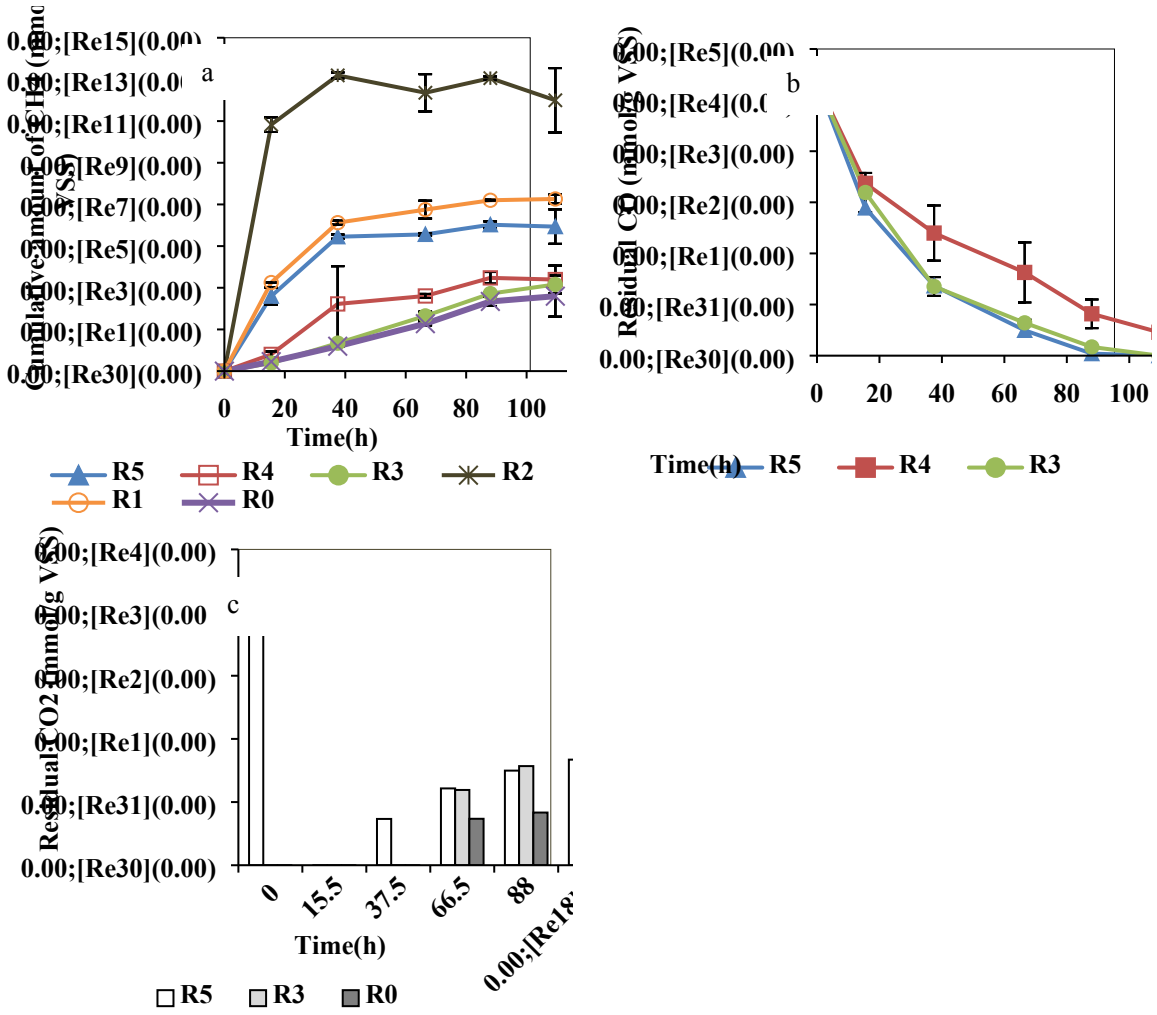

Fig. S2. Anaerobic biomethanation potential of AGS under 37°C（R0-control, R1-sodium acetate, R2-H_2/CO_2, R3-CO/N_2, R4-CO/H_2; R5-$CO/CO_2/H_2$）(a) CH_4, (b) CO, and (c) CO_2.

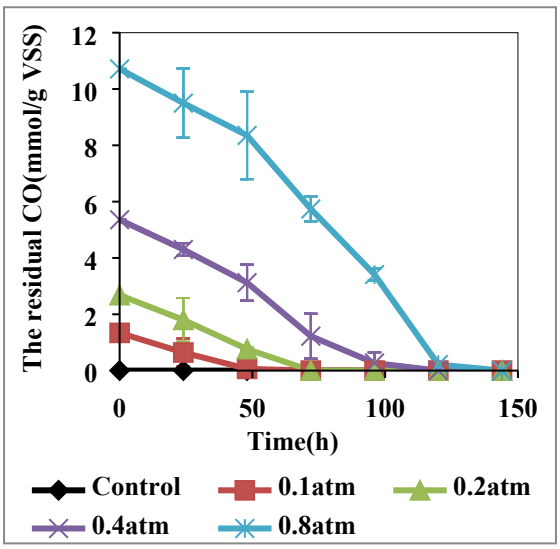

Fig. S3. Effect of CO partial pressures (atm) on methane production from CO.

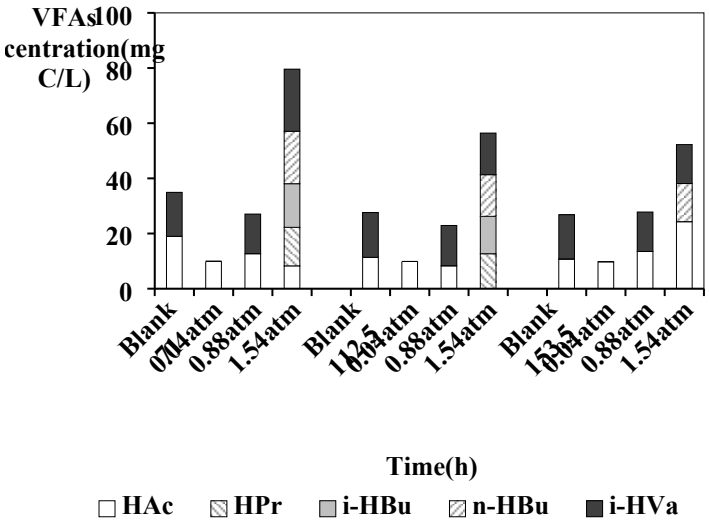

Fig. S4. Effect of H_2 partial pressures (atm) on VFAs distribution during BFG fermentation by AGS under 37°C.