

Supplementary Information (SI)

Can bicarbonate replace phosphate to improve the sustainability of bioelectrochemical systems for H₂ production?

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Table S1. pH and conductivity of different electrolyte buffer systems

Buffer type	Phosphate (%)	Bicarbonate (%)	pH	Conductivity (S/m)
P/C@100%	100	0	7.04	1.13
P/C@20%	20	80	8.40	1.30
P/C@0.8%	0.8	99.2	8.45	1.74
P/C@0%	0	100	8.47	1.80

Table S2. The BLAST results of the distinct DGGE band DNA in the bioanode of MECs and MFCs operated with different buffers

Sample	Species	Closest gene sequence	Identities
OTU-1	<i>Spirochaetaceae</i> sp.	<i>Spirochaetaceae</i> bacterium S37_12_1 LK391556.1	151/151 (100%)
OTU-2	<i>Geoalkalibacter ferrihydriticus</i>	Uncultured bacterium C4 AB630334.1	147/148(9 9%)
OTU-3	—	Uncultured bacterium TB003- 114 AB196087.1	131/132 (99%)
OTU-4	<i>Soehngenia</i> sp.	<i>Soehngenia</i> sp. B312138 HQ133002.1	120/122 (98%)
OTU-5	<i>Soehngenia</i> sp.	<i>Soehngenia</i> sp. B312138 HQ133002.1	127/127 (100%)
OTU-6	<i>Geobacter</i> sp.	Uncultured <i>Geobacter</i> sp. MEC25- 11 HM124838.1	152/152(1 00%)
OTU-7	<i>Bacteroidetes</i> sp.	Uncultured <i>Bacteroidetes</i> bacterium C1016S KF193877.1	147/148 (99%)
OTU-8	<i>Geobacter</i> sp.	Uncultured bacterium MFC4P_296 JF309187.1	152/152 (100%)
OTU-9	<i>Nitriicola</i> sp.	<i>Nitriicola</i> sp. LAR05R9 JX945779.1	157/158 (99%)
OTU-10	<i>Geobacter</i> sp.	Uncultured bacterium MEC_Bicarb_Ac-041 GQ152932.1	162/162 (100%)
OTU-11	<i>Geobacter</i> sp.	Uncultured bacterium MECB5- C04 KF171498.1	144/145 (99%)
OTU-12	<i>Clostridium</i> sp.	Uncultured <i>Clostridium</i> sp. 8 JX548536.1	147/147 (100%)
OTU-13	<i>Clostridium</i> sp.	Uncultured <i>Clostridium</i> sp. 8 JX548536.1	143/144 (99%)
OTU14	—	<i>Acholeplasmamorum</i> strain 72- 043 NR_042959.1	112/120 (93%)
OTU15	—	<i>Acholeplasmamorum</i> strain 72- 043 NR_042959.1	112/120 (93%)

Table S3. The BLAST results of the distinct DGGE band DNA in the bioanode of MECs with different applied voltages (0.5 V~1.0 V) and different time slot

Sample	Species	Closest gene sequence	Identities
OTU-S1	<i>Clostridium</i> sp.	Uncultured <i>Clostridium</i> sp. isolate DGGE gel band 8 JX548536.1	146/146(100%)
OTU-S2	<i>Arcobacter</i> sp.	Uncultured bacterium clone SanDiego_a6357 KF799750.1	138/138(100%)
OTU-S3	<i>Pseudomonas</i> sp.	<i>Pseudomonas</i> sp. GRPAa2 GU939693.1	144/148(97%)
OTU-S4	<i>Geobacter</i> sp.	Uncultured bacterium clone MFC4P_296 JF309187.1	151/151(100%)
OTU-S5	<i>Geobacter</i> sp.	<i>Geobacter</i> sp. GSS01 KJ620987.1	151/151(100%)
OTU-S6	<i>Geobacter</i> sp.	<i>Geobacter</i> sp. GSS01 KJ620987.1	148/152(97%)
OTU-S7	<i>Geobacter</i> sp.	<i>Geobacter</i> sp. GSS01 KJ620987.1	150/153(98%)
OTU-S8	<i>Geobacter</i> sp.	<i>Geobacter</i> sp. GSS01 KJ620987.1	149/149(100%)
OTU-S9	<i>Geobacter</i> sp.	Uncultured bacterium clone MFC4P_296 JF309187.1	149/149(100%)
OTU-S10	<i>Geobacter</i> sp.	Uncultured bacterium clone MFC4P_296 JF309187.1	149/149(100%)

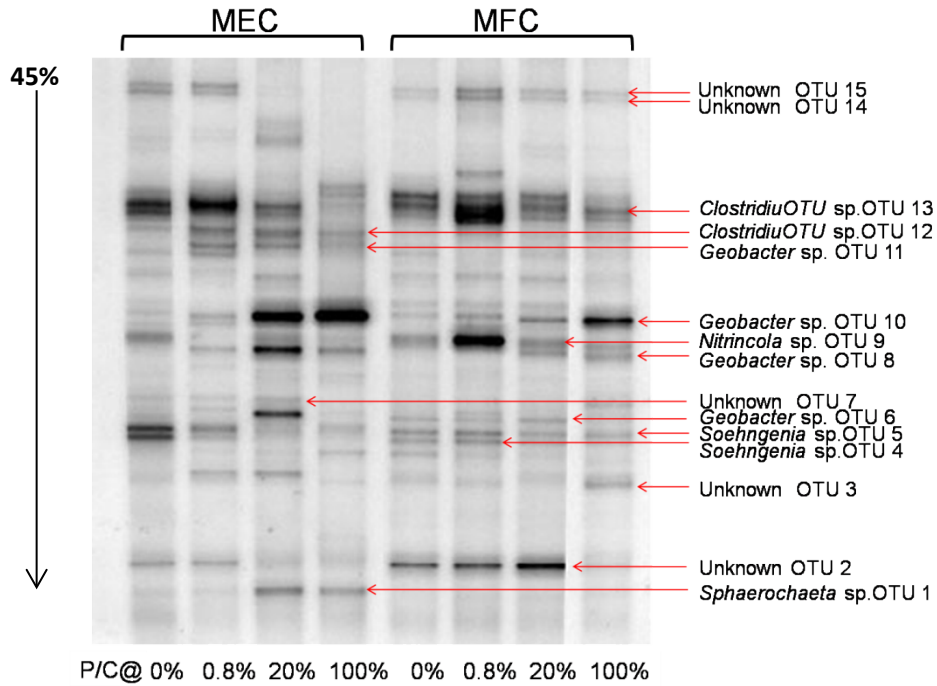


Fig. S1 The DGGE profile showing the microbial diversity and population in the bioanodes of MECs, together with their precursor MFCs. All MECs and MFCs were operated with electrolyte buffers at different P/C ratios (with a total concentration of 0.1 M). The formamide gradient in DGGE gel is from 45% to 60%.

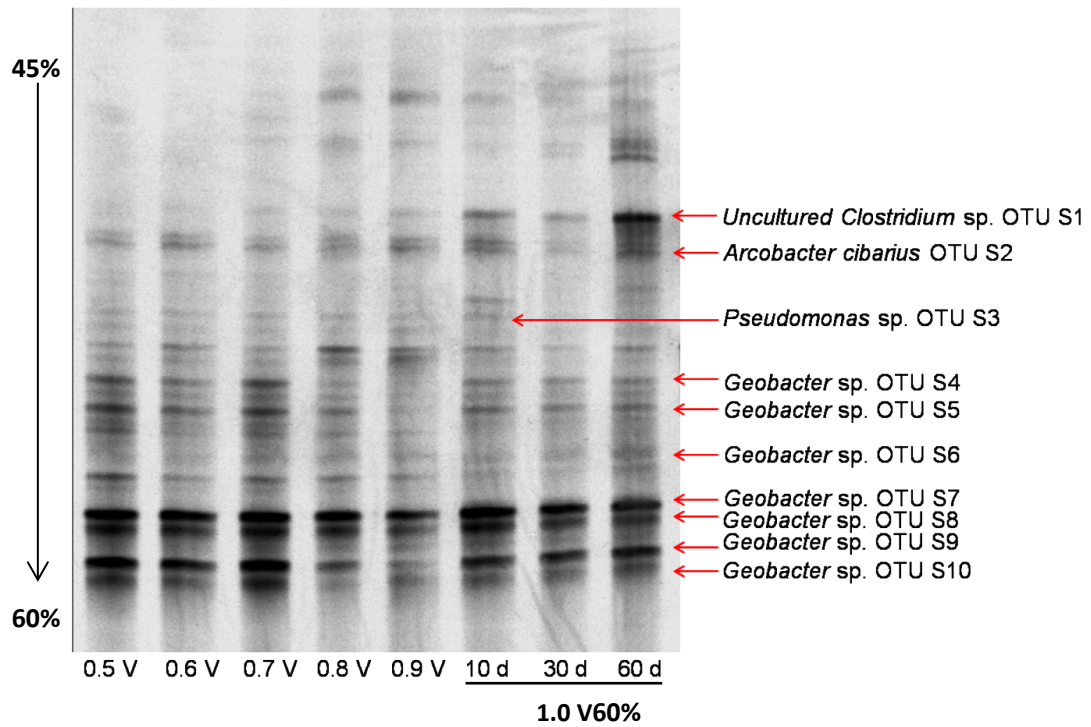


Fig.S2 The DGGE profile showing the microbial diversity and population in the bioanodes of MECs operated under different applied voltages (0.5 V~1.0V) and different time slot (1.0V: 10 d, 30 d, 60 d). All MECs were operated with the electrolyte buffers at P/C@20% (total concentration: 0.1 M). The formamide gradient in DGGE gel is from 45% to 60%.