Supplementary Information

Resistance Assessment of Microbial Electrosynthesis for Biochemical Production to Changes in Delivery Methods and CO₂ Flow Rates

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**Figure S1** Serum vial experiment (A) to test whether 2-bromoethanesulfonate (Na-2-BES) could be reduced by microbes in MES. No Na-2-BES was added to DSMZ 879 media (omitting yeast extract, Na-resazurin, D-Fructose, L-Cysteine, MgSO\(_4\) and Na\(_2\)S) in the control group while 15 mM Na-2-BES was added in BES group. 1 mM acetate and 1.5 bar H\(_2\):CO\(_2\) (80:20) at headspace of serum vials were used as electron donors in all serum vials. Serum vial experiment (B) to determine the role of sulfate reducing bacteria (SRB) in utilizing acetate in MES. Control: no electron donor and sodium molybdate (Na\(_2\)MoO\(_4\); inhibits sulfate reducers) were added; Acetate and Acetate/Na\(_2\)MoO\(_4\) groups: acetate was added as the sole electron donor. Results clearly show that H\(_2\)S was not generated in the presence of sodium molybdate but was generated in the absence of sodium molybdate, suggesting the role of SRB in MES cathode. Serum vial experiment (C) for bio-methane or H\(_2\)S production utilizing H\(_2\) in headspace or acetate as electron donors. Control group: no electron donors (i.e., acetate or H\(_2\)); H\(_2\) group: 1.5 bar H\(_2\):CO\(_2\) (80:20) as electron donor; Acetate group: 1 mM acetate as electron donor. Results clearly show that SRB were more competitive than methanogens to utilize H\(_2\) as electron donors. No SO\(_2\) was detected in the serum vials. Suspended biomass collected from MES cathode chamber during enrichment stage was used as the inoculum for all the serum vial experiments.
Figure S2 Methane, acetate and hydrogen production in MES with abiotic CHT/Ni foam/CNT cathode and suspended biomass only, showing the role of suspended biomass in methane and acetate generation. CO₂ was delivered through the abiotic CHT/Ni foam/CNT cathode at a flow rate of 10 ml/min.
Figure S3 Heatmap of the 15 most abundant phylotypes in the original sludge (inoculum) and biocathode at the end of enrichment phase (i.e., Phase I). The taxa level shown on the left-hand side represents the phyla and the lowest classification level possible (u: unassigned, o: order, f: family, or g: genus).