Electronic Supplementary Material (ESI) for Environmental Science: Water Research & Technology.

Supporting Information

Enhancing the Performance of a Microbial Electrochemical System with Carbon-based Dynamic Membrane as both Anode Electrode and Filtration Media

Fubin Liu [a], Hanan Moustafa [b], Mohammed Salah El-Din Hassouna [b], Zhen He [a*]

[a] Department of Energy, Environmental and Chemical Engineering, Washington University in St. Louis, St. Louis, MO 63130, USA

[b] Institute of Graduate Studies and Research, Alexandria University, Alexandria 21526, Egypt

[*]Corresponding author. Phone: (314) 935-7124; e-mail: zhenhe@wustl.edu

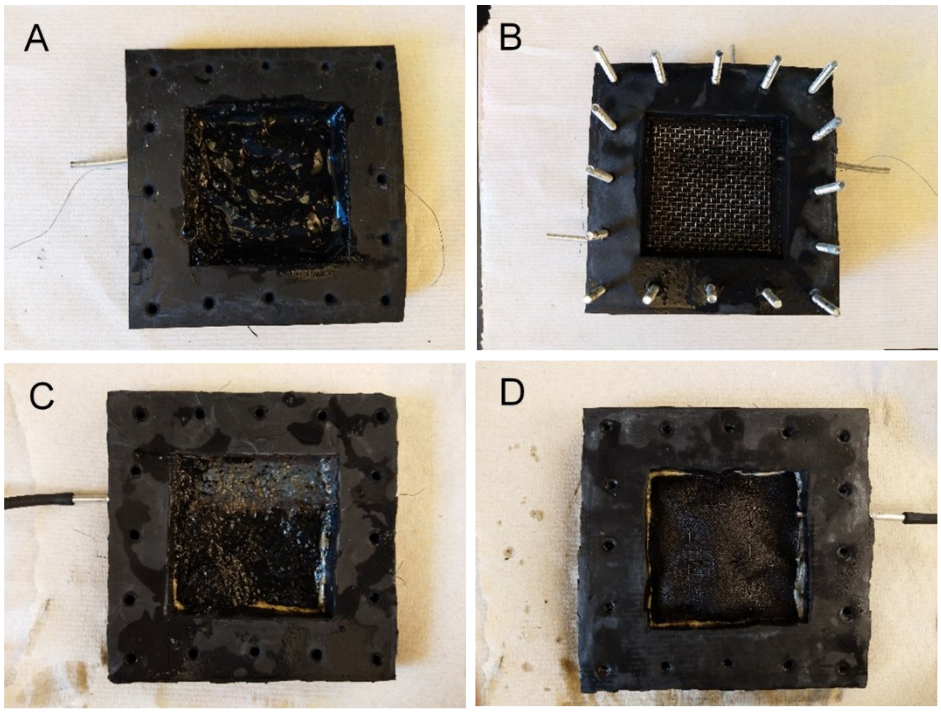

Fig. S1 Photos of (A) CCC of R1 facing anaerobic chamber, (B) CCC of R1 facing anode chamber, (C) CCC of R3 facing anaerobic chamber, and (D) CCC of R3 facing anode chamber.

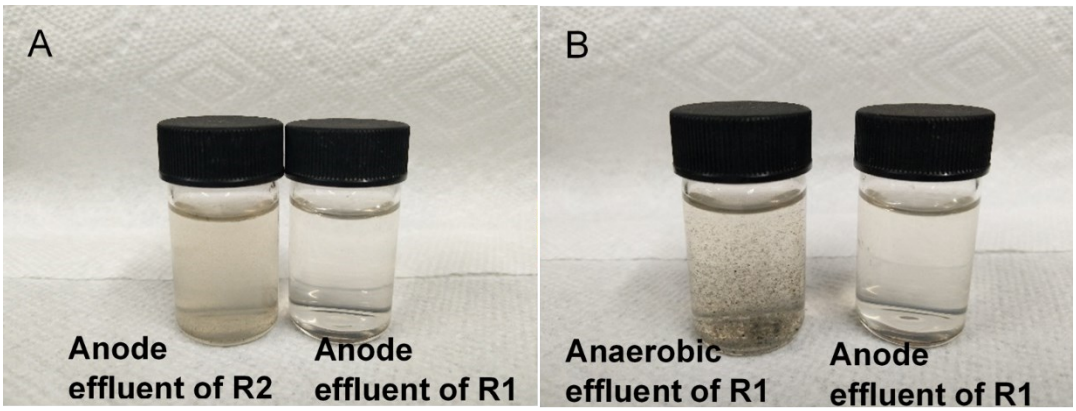

Fig. S2 Pictures of samples of (A) anode effluents of R1 and R2, (B) anaerobic effluent and anode effluent of R1.

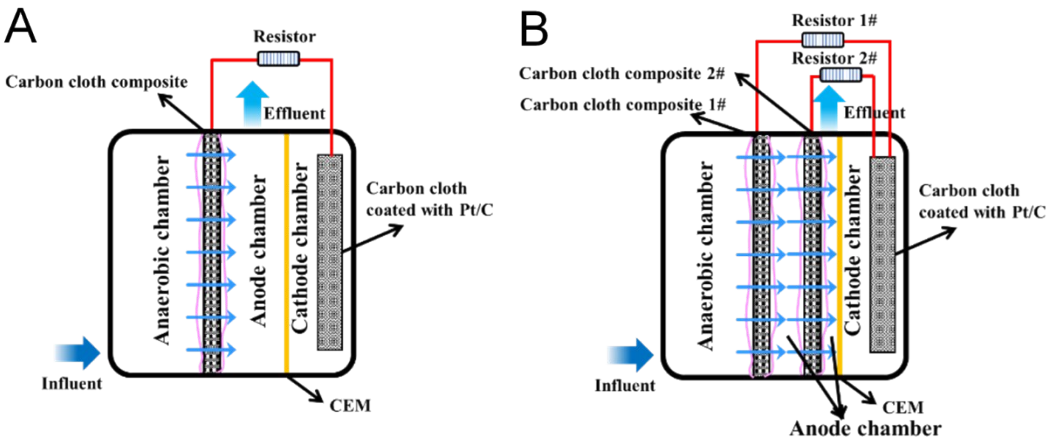

Fig. S3 Schematics of (A) $DMES_{1\text{-layer}}$ and (B) $DMES_{2\text{-layer}}$.

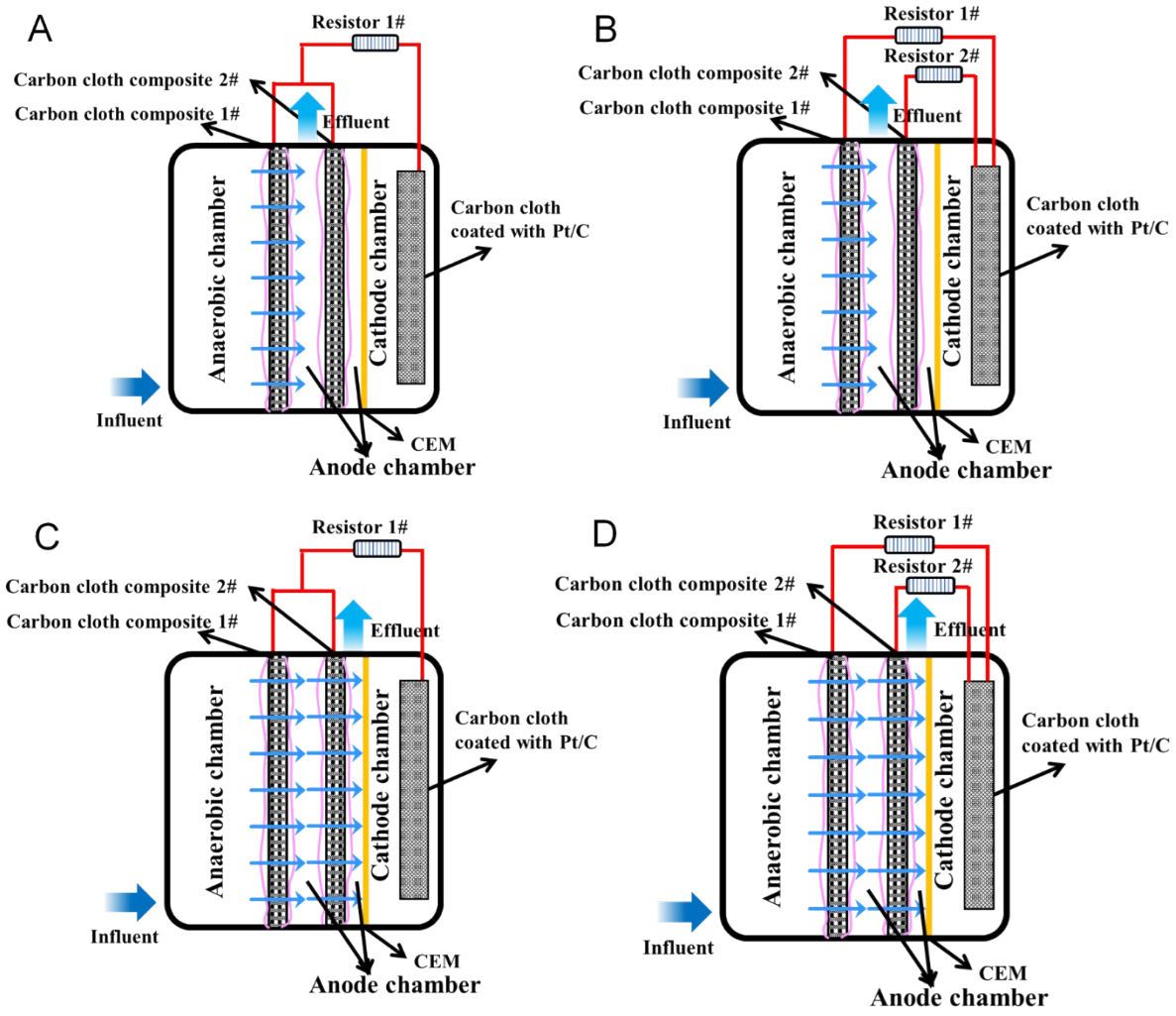

Fig. S4 Schematic of $DMES_{2\text{-layer}}$ under different operating modes. (A) One-membrane filtration with CCCs connected together to cathode with one resistor (1M1R); (B) One-membrane filtration with CCCs connected separately to cathode with two resistors (1M2R); (C) Two-membrane filtration with CCCs connected together to cathode with one resistor (2M1R); (D) Two-membrane filtration with CCCs connected separately to cathode with two resistors (2M2R).

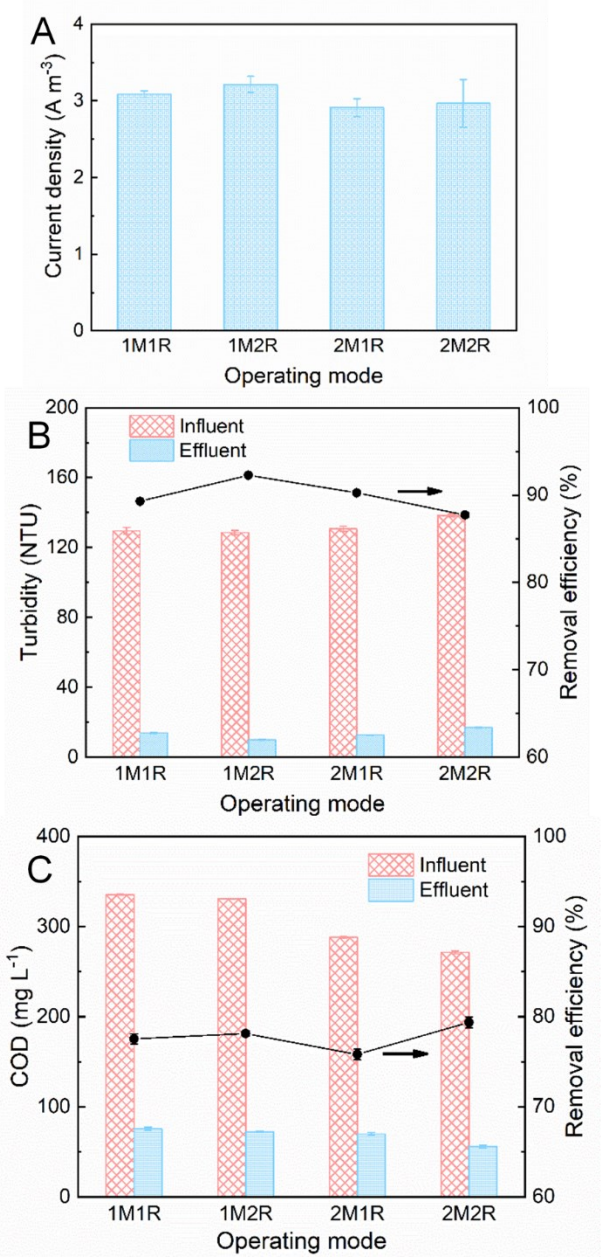

Fig. S5 (A) Average current density of $DMES_{2\text{-layer}}$ under different operating modes; (B) Turbidity of influent and effluent, and removal efficiency of turbidity; (C) COD concentration in influent and effluent, and removal efficiency of COD.

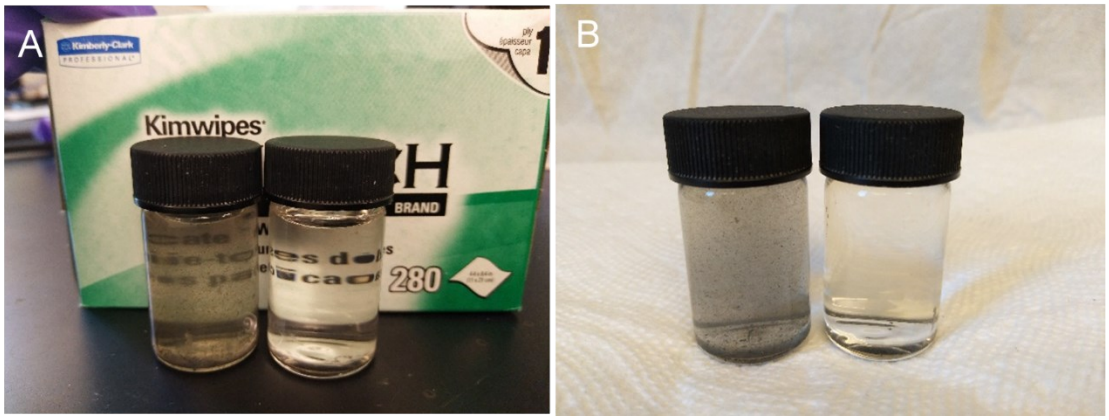

Fig. S6 Pictures of raw domestic wastewater and effluent of $DMES_{1\text{-}layer}$ on (A) 15 d and (B) 30 d during long time operation.

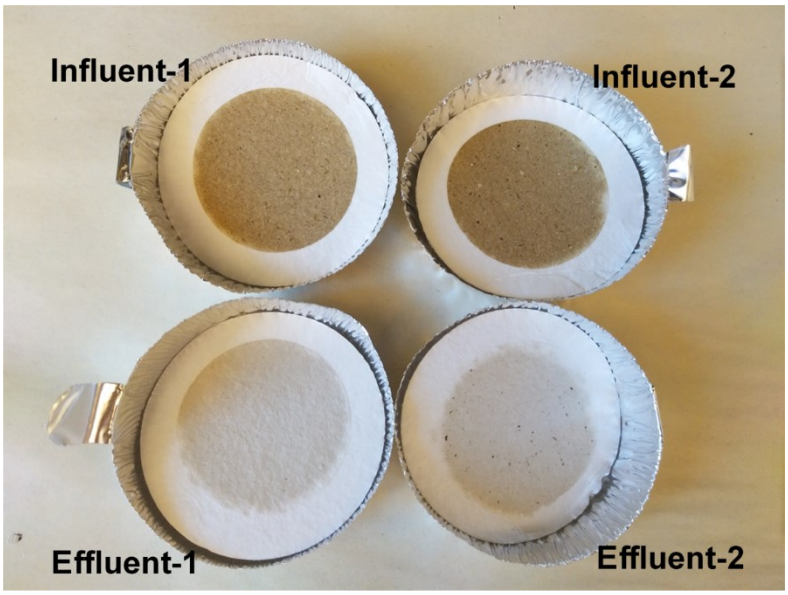

Fig. S7 Pictures of filtrate papers after filtrating influent and effluent on 30th day during long-term operation.