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

Supplementary Information

Engineering a Membrane Based Air Cathode for Microbial Fuel Cells via Hot Pressing and Using Multi-Catalyst Layer Stacking

Wulin Yang[a] and Bruce E. Logan*[a]

[a]Department of Civil and Environmental Engineering, The Pennsylvania State University, University Park, Pennsylvania 16802, United States

*Corresponding Author. Telephone: +1 814 863 7908. Fax: +1 814 863 7304. E-mail: blogan@psu.edu.

Fig. S1 Pressing machine with temperature control unit.

Table S1. Oxygen mass transfer coefficient for AC cathodes pressed at 25, 60 and 120 °C

Temperature (°C)	Oxygen mass transfer coefficient $k \times 10^{-3}$ (cm s^{-1})
25	2.6 ± 0.2
60	2.5 ± 0.1
120	3.0 ± 0.3

Table S2. Internal resistances and open circuit voltages of MFCs with SS/CL, SS/2CL and 2SS/2CL cathode configurations.

Cathode configuration	Internal resistances (Ω)	Open circuit voltage (mV)
SS/CL	86	708
SS/2CL	89	687
2SS/2CL	89	660

The internal resistances of MFCs were calculated by linear fitting of the voltage-current curves obtained in the single cycle polarization tests.

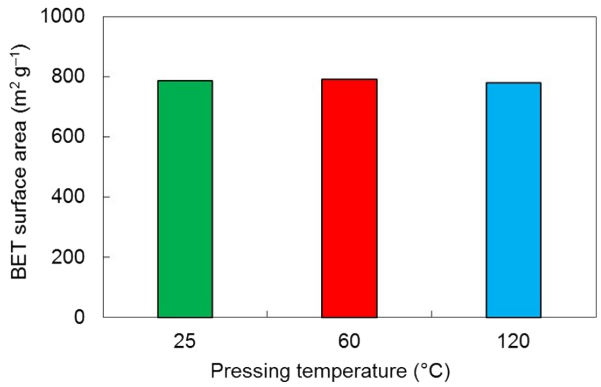

Fig. S2 BET surface area for AC catalyst layers pressed at 25, 60 and 120 °C.

In order to prove that the better performance of SS/2CL than SS/CL was not due to the position difference of the CL but from the additional CL, LSV tests were conducted for AC cathodes (no diffusion layer) with CL facing solution side and air side, as shown in Fig. S3.

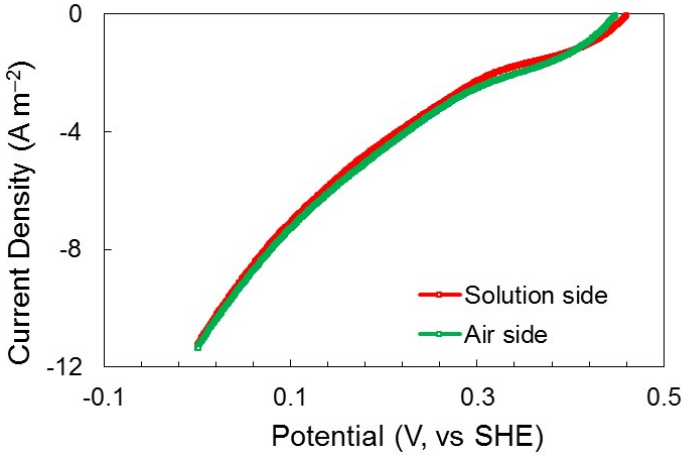

Fig. S3 Current-voltage (polarization) curves for the AC cathodes (no diffusion layer) with CL facing solution side and air side in an abiotic electrochemical cell.