Assessing the Performance of Continuous-Flow Microbial Fuel Cells and Membrane Electrode Assembly with Electrodeposited Mn Oxide Catalyst

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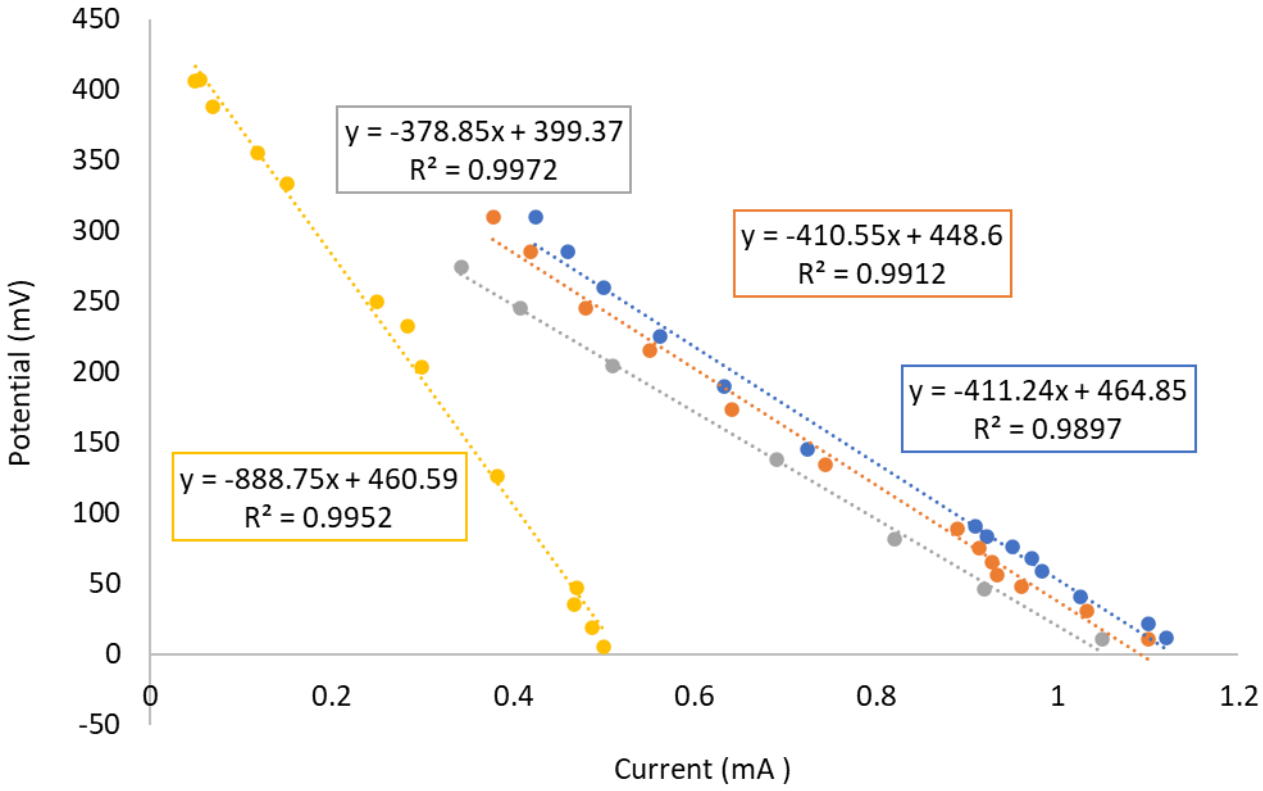

Figure S1: Slopes of the linear region of the polarization curves for the determination of the internal resistances (AC/CB in yellow; Mn100 in grey; Mn20 in orange and Mn10 in blue).

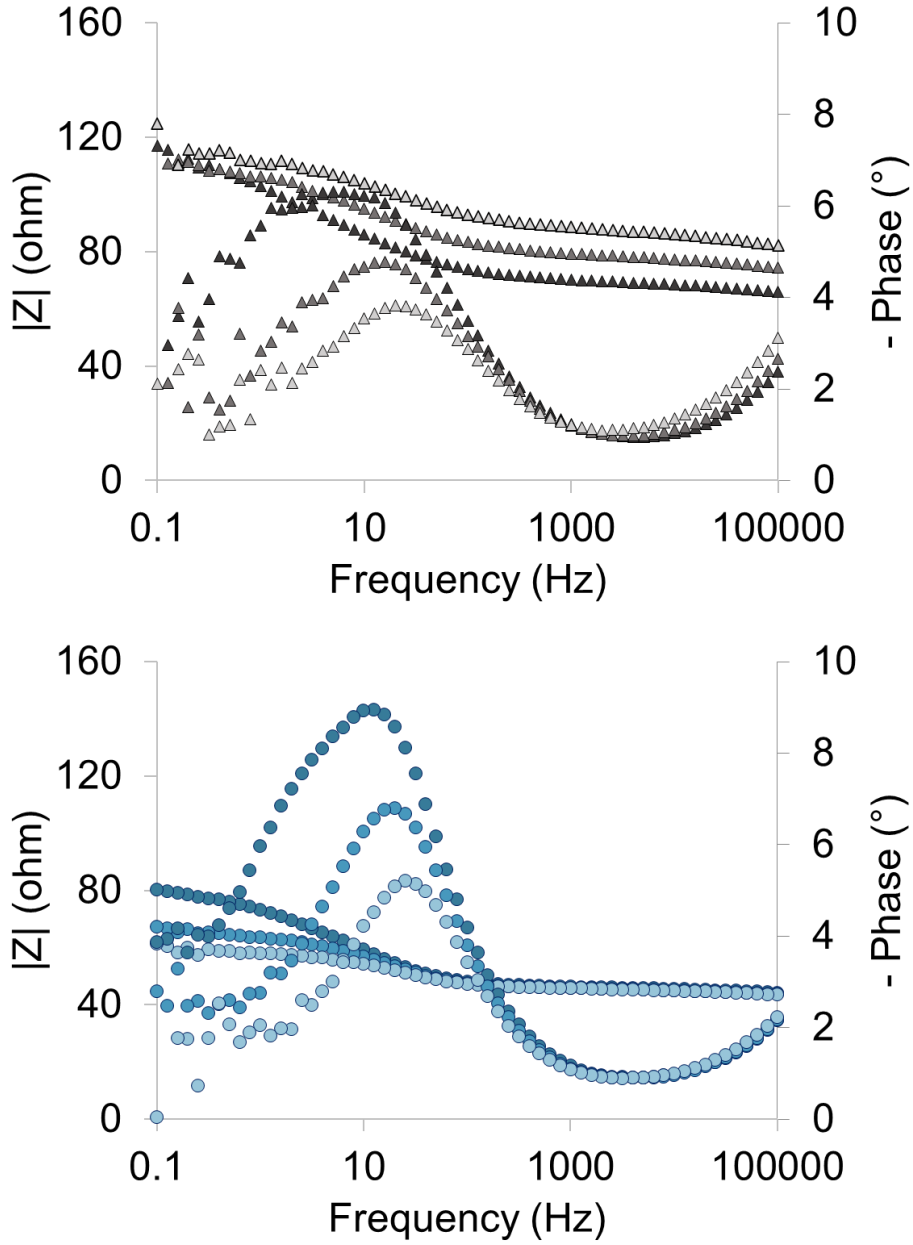

Figure S2: Bode plots obtained from EIS experiments with Mn10 electrodes under dry (black symbols) and saturated air (blue symbols) conditions.

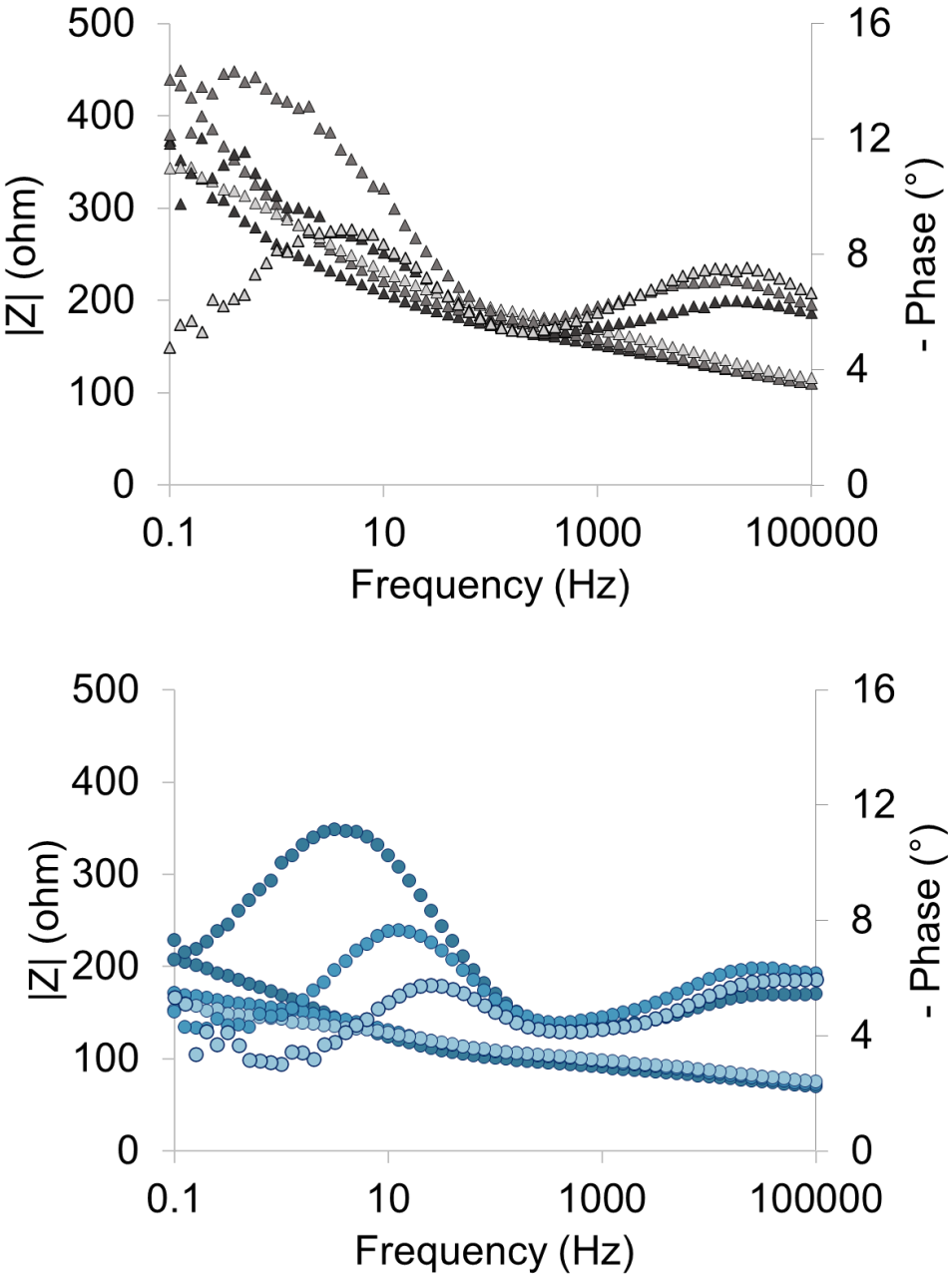

Figure S3: Bode plots obtained from EIS experiments with AC/CB electrodes under dry (black symbols) and saturated air (blue symbols) conditions.

Table S1 a-d: Parameters of the equivalent circuits used to characterise the cathodes

Table S1 a: Mn10 Electrode

	Dry air Potential applied / V			**Saturated air Potential applied / V**		
	-1.7	**-1.9**	**-2.1**	**-1.7**	**-1.9**	**-2.1**
chi-squared (χ2) K-K analysis	$5.24\ 10^{-5}$	$5.24\ 10^{-5}$	$5.24\ 10^{-5}$	$1.56\ 10^{-6}$	$7.44\ 10^{-6}$	$5.21\ 10^{-5}$
chi-squared (χ2)	$1.11\ 10^{-4}$	$1.11\ 10^{-4}$	$1.11\ 10^{-4}$	$2.80\ 10^{-5}$	$1.70\ 10^{-5}$	$3.20\ 10^{-5}$
R_Ω / Ω cm²	322	362	401	197.8	194.1	185.7
Q_{DL} / mS s^n cm^{-2}	0.76	0.58	0.58	0.54	0.37	0.44
n	0.52	0.56	0.59	0.7	0.6	0.6
R_{CT} / Ω cm²	244	169.5	126.35	155.1	89.5	66.1
Q_{cont} / µF cm^{-2}	1.1	0.85	0.76	1.34	5	3.6
n	0.78	0.76	0.83	0.68	0.76	0.75
R_{cont} / Ω cm²	21.25	27.2	35.8	31.1	34	40.5
W / S $s^{-0.5}$ cm^{-2}	0.076	0.084	0.06	0.042	0.052	0.076

Table S1 b: Mn10 Electrode after previous EIS series

	Dry air Potential applied / V
	-1.7
chi-squared (χ2) K-K analysis	$1.21\ 10^{-6}$
chi-squared (χ2)	$4.49\ 10^{-6}$
R_Ω / Ω cm²	305
Q_{DL} / mS s^n cm^{-2}	0.5
n	0.63
R_{CT} / Ω cm²	157.4
Q_{cont} / µF cm^{-2}	5
n	0.48
R_{cont} / Ω cm²	144.95
Q_3 / mS s^n cm^{-2}	1.8
n	0.99
R_3 / Ω cm²	112.5
W / S $s^{-0.5}$ cm^{-2}	0.04

Table S1 c: AC/CB electrode

	Dry air Potential applied / V			Saturated air Potential applied / V		
	-1.7	**-1.9**	**-2.1**	**-1.7**	**-1.9**	**-2.1**
chi-squared (χ2) K-K analysis	$7.87\ 10^{-5}$	$7.72\ 10^{-5}$	$9.85\ 10^{-4}$	$5.52\ 10^{-6}$	$6.57\ 10^{-5}$	$6.79\ 10^{-5}$
chi-squared (χ2)	$1.25\ 10^{-4}$	$5.26\ 10^{-5}$	$2.94\ 10^{-5}$	$9.34\ 10^{-6}$	$2.4\ 10^{-6}$	$1.25\ 10^{-4}$
R_Ω / Ω cm^2	432.50	453.20	466.00	273.75	269.8	292
Q_{DL} / mS s^n cm^{-2}	0.73	0.47	0.31	0.42	0.24	0.31
n	0.35	0.45	0.54	0.59	0.71	0.58
R_{CT} / Ω cm^2	2658.50	2605.00	885.50	516	223.45	219.2
Q_{cont} / µF cm^{-2}	24.58	18.01	15.94	43.28	41.62	21.74
n	0.41	0.45	0.45	0.39	0.38	0.43
R_{cont} / Ω cm^2	347.00	399.25	475.05	218.5	278.5	223.35
W / S s$^{-0.5}$ cm^{-2}	0.05	0.05	0.02	0.01	0.01	0.01

Table S1 d: Pt/C electrode

	Dry air Potential applied / V			Saturated air Potential applied / V		
	-1.7	**-1.9**	**-2.1**	**-1.7**	**-1.9**	**-2.1**
chi-squared (χ2) K-K analysis	$7.93\ 10^{-5}$	$6.57\ 10^{-5}$	$2.69\ 10^{-5}$	$2.62\ 10^{-6}$	$1.09\ 10^{-6}$	$5.50\ 10^{-6}$
chi-squared (χ2)	$1.93\ 10^{-4}$	$1.77\ 10^{-4}$	$8.56\ 10^{-5}$	$1.98\ 10^{-5}$	$1.80\ 10^{-5}$	$2.02\ 10^{-5}$
R_Ω / Ω cm^2	472.95	454.5	455.3	259.65	254.5	258
Q_{DL} / mS s^n cm^{-2}	0.196	0.164	0.17	0.44	0.3	0.34
n	0.6	0.658	0.66	0.59	0.67	0.67
R_{CT} / Ω cm^2	1135	726	520	519	270	179
Q_{cont} / µF cm^{-2}	3.6	3.2	3.0	6.5	6.6	6.8
n	0.58	0.56	0.53	0.56	0.56	0.56
R_{cont} / Ω cm^2	200	251.65	260.85	121.75	130	121.5
W / S s$^{-0.5}$ cm^{-2}	0.066	0.068	0.074	0.088	0.134	0.134

Table S2: Parameters of the equivalent circuit in figure 8.

chi-squared (χ2) K-K analysis	$4.0\ 10^{-5}$
chi-squared (χ2)	$3.1\ 10^{-6}$
R_Ω / Ω	3.35
Q_A / µS s^n	49.1
n	0.83
R^P_A / Ω	304
Q_C / µS s^n	17.5
n	0.44
R^P_C / Ω	59.2

Activation of the felt anodes:

- soak the material in pure acetone overnight,
- soak the material in 200 g L^{-1} ammonium peroxydisulfate and 1M HCl for 15 min
- wash the material in distilled water
- dry the material in muffle furnace at 450°C for 30 min