Supplementary Information

Submicron-Thick Single Anion-Conducting Polymer Electrolytes

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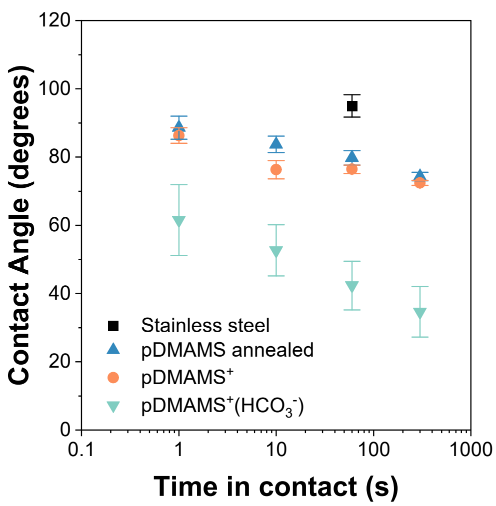

Fig. S1 Contact-angle measurements for various *i*CVD-derived pDMAMS films.

Table S1 Fit parameters from dry Nyquist equivalent-circuit models.

Sample ID	R1	R2	Q_1	Q_1_a
Br_1	67	1128	1.0×10^{-10}	1
Br_2	52	1291	1.2×10^{-10}	1
Br_3	103	1070	0.7×10^{-10}	1
Br_4	22	1414	2.8×10^{-10}	1
Br_5	38	885	1.4×10^{-10}	1
Average	**56**	**1158**	$\mathbf{1.4\times10^{-10}}$	**1**
HCO_3_1	62	97	4.5×10^{-9}	0.9
HCO_3_2	93	11	5.3×10^{-10}	1
HCO_3_3	87	56	1.2×10^{-9}	1
HCO_3_4	119	78	2.2×10^{-8}	0.8
HCO_3_5	58	145	6.7×10^{-10}	1
HCO_3_6	115	48	1.1×10^{-7}	0.75
Average	**84**	**77**	$\mathbf{5.8\times10^{-9}}$	**0.94**
OH_1	76	56	1.7×10^{-8}	0.85
OH_2	76	37	2.5×10^{-8}	0.85
OH_3	67	66	1.7×10^{-8}	0.85
OH_4	75	42	1.1×10^{-8}	0.9
OH_5	74	56	7.6×10^{-9}	0.9
OH_6	58	89	6.0×10^{-9}	0.9
Average	**74**	**51**	$\mathbf{1.6\times10^{-8}}$	**0.87**

Table S2 Fit parameters from water-swelled Nyquist equivalent-circuit models.

Sample ID	R1	R2	Q_1	Q_1_a	Q_2	Q_2_a
Br_1	24	23	7.3×10^{-9}	1	5.4×10^{-5}	0.68
Br_2	15	68	4.7×10^{-9}	1	4.2×10^{-5}	0.70
Br_3	21	34	6.8×10^{-9}	1	6.2×10^{-5}	0.70
Br_4	29	23	8.7×10^{-9}	1	2.0×10^{-4}	0.59
average	**22**	**37**	$\mathbf{6.9\times10^{-9}}$	**1**	$\mathbf{9.2\times10^{-5}}$	**0.67**
HCO_3_1	20	7	5.4×10^{-7}	0.95	9.2×10^{-5}	0.67
HCO_3_2	19	11	1.8×10^{-7}	1	1.0×10^{-4}	0.66
HCO_3_3	30	11	2.3×10^{-7}	0.97	1.0×10^{-4}	0.67
average	**23**	**10**	$\mathbf{3.2\times10^{-7}}$	**0.97**	$\mathbf{9.8\times10^{-5}}$	**0.67**
OH_1	19	26	7.3×10^{-9}	1	8.3×10^{-5}	0.72
OH_2	0	17	1.1×10^{-5}	0.45	1.9×10^{-4}	0.63
OH_3	21	14	6.5×10^{-6}	0.8	4.9×10^{-5}	0.71
OH_4	16	8	2.2×10^{-6}	0.91	5.5×10^{-5}	0.71
OH_5	13	9	5.5×10^{-6}	0.85	5.2×10^{-5}	0.74
average	**14**	**15**	$\mathbf{5.0\times10^{-6}}$	**0.8**	$\mathbf{8.6\times10^{-5}}$	**0.70**

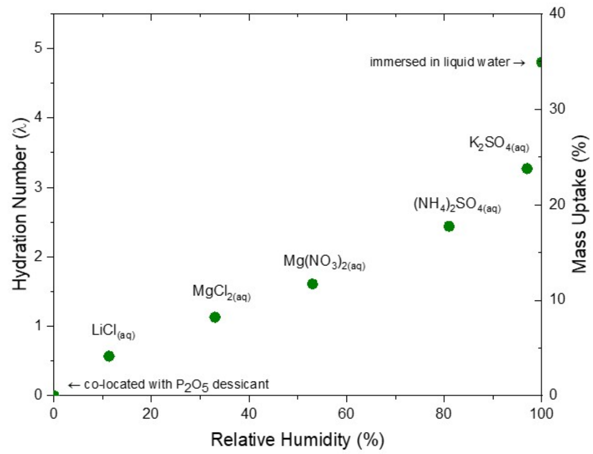

Fig. S2 Water uptake in hydration number (λ) and percent mass (of the dry membrane mass) for pDMAMS⁺(Br⁻) equilibrated over P_2O_5 (0% RH), various salt solutions (11–97% RH), and in liquid deionized water (100% RH).

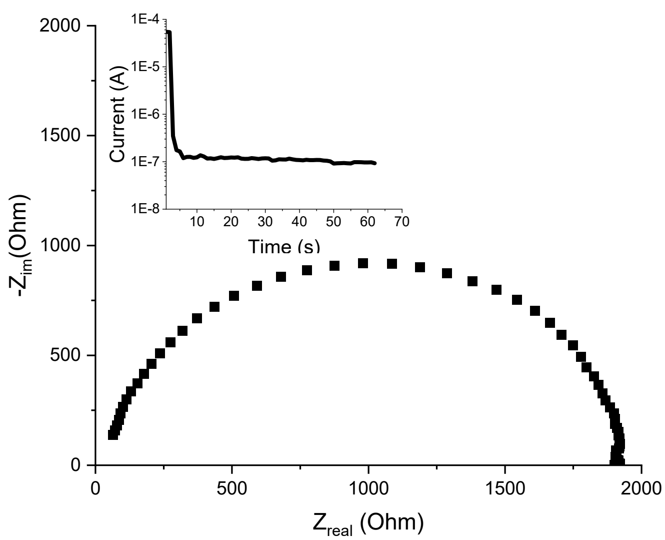

Fig. S3 EIS spectra of pDMAMS⁺(Br-) showing adequate electrode-electrolyte contact. Inset: current response of potentiostatic hold at 0.1 V.