Supplementary Material

Electrolyte Effect on the Electrochemistry of Doping of PProDOT derivatives

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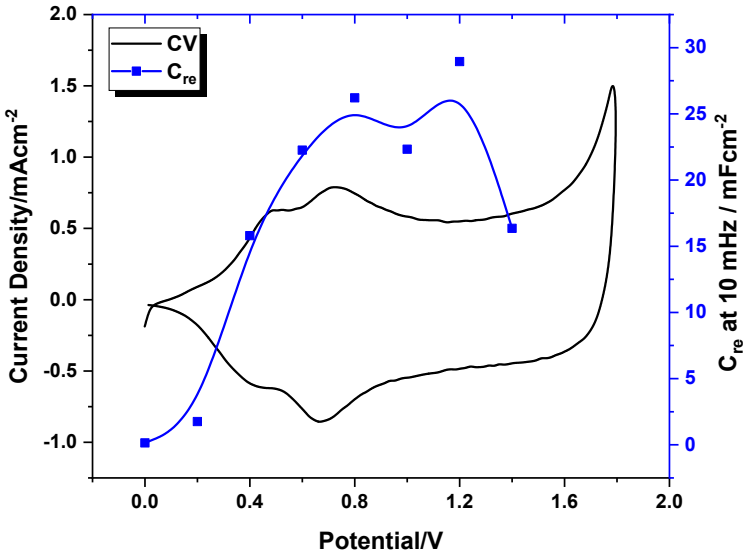
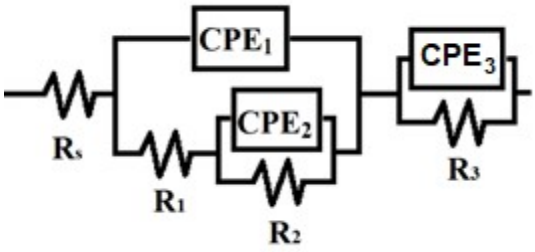


Figure S1 – CV graph for P(ProDOT-Br) in 0.1 M Et_4NBF_4/ACN at a scan rate of 25 mVs^{-1} and capacitance as a function of applied potential in 0.1 M Et_4NBF_4/ACN extracted from capacitance Bode Plot at a low frequency of 10 mHz, from EIS measurements.

Table S1 – Selected equivalent circuit model (ECM), comparison of the ECM parameters for ProDOT derivatives in Et_4NPF_6, $NaClO_4$ and Et_4NBF_4 electrolytes.



ProDOT–Br	Et_4NPF_6	Et_4NBF_4	$NaClO_4$
R_s/ohm.cm^2	2.10	7.57	1.58
CPE_1/ Ss^n.cm^{-2}	1.12E-02	6.39E-05	3.78E-08
n_1	1.00	0.85	1.00
R_1/Ω.cm^2	4.34	4.14	234.43
CPE_2/Ss^n.cm^{-2}	1.16E-03	4.98E-03	2.21E-03
n_2	0.69	0.99	0.99
R_2/Ω.cm^2	6.56E+04	4.74E+04	7.11E+04
Q3/Ss^n.cm^{-2}	9.24E-07	1.84E-02	2.36E-04
n_3	0.93	0.38	0.74
R_3/Ω.cm^2	12.68	57.46	207.27
Chi squared / χ^2	1.16E-03	5.75E-04	4.56E-04
ProDOT–OBz	Et_4NPF_6	Et_4NBF_4	$NaClO_4$
R_s/Ω.cm^2	3.57	5.84	7.09
CPE_1/ Ss^n.cm^{-2}	8.48E-03	7.66E-03	4.91E-05
n_1	1.00	1.00	0.86
R_1/Ω.cm^2	1.17E+01	7.44E+02	2.08E+03
CPE_2/Ss^n.cm^{-2}	1.04E-02	7.45E-04	1.45E-03
n_2	1.00	1.00	0.99
R_2/Ω.cm^2	8.61E+03	1.65E+05	7.68E+05
Q_3/Ss^n.cm^{-2}	2.06E-07	2.34E-02	1.68E-02
n_3	0.89	0.39	1.00
R_3/Ω.cm^2	11.87	151.98	110.69
Chi squared /χ^2	2.86E-03	3.50E-04	9.64E-04
ProDOT–OPh	Et_4NPF_6	Et_4NBF_4	$NaClO_4$
R_s/Ω.cm^2	8.05	3.52	2.96
CPE_1/ Ss^n.cm^{-2}	4.18E-03	1.86E-07	7.14E-08
n_1	3.33E-01	9.60E-01	9.90E-01
R_1/Ω.cm^2	59.50	8.16	9.34
CPE_2/Ss^n.cm^{-2}	1.47E-03	3.62E-03	1.02E-04
n_2	0.67	1.00	0.77
R_2/Ω.cm^2	5.02E+04	2.04E+04	1.70E+04
Q_3/Ss^n.cm^{-2}	1.82E-02	4.28E-04	1.37E-04
n_3	1.00	0.63	0.76
R_3/Ω.cm^2	1.31E+05	9.58E+02	2.77E+04
Chi squared / χ^2	2.29E-03	3.82E-03	1.47E-03
ProDOT–OTs	Et_4NPF_6	Et_4NBF_4	$NaClO_4$
R_s/Ω.cm^2	10.40	6.19	2.39
CPE_1/ Ss^n.cm^{-2}	3.92E-06	7.70E-5	9.36E-08
n1	1.00	0.81	1.00
R_1/Ω.cm^2	3.75	37.99	884.85
CPE_2/Ss^n.cm^{-2}	1.68E-03	3.22E-03	1.50E-04
n2	0.97	1.00	0.79

R_2/Ω.cm²	4.53E+05	5.87E+04	8.45E+02
Q_3/Ss^n.cm^{-2}	1.80E-03	2.38E-03	1.15E-03
n_3	0.77	0.66	1.00
R_3/Ω.cm²	3.01E+01	6.85E+01	1.54E+05
Chi squared / χ^2	3.82E-03	2.79E-03	3.68E-04

ProDOT	**Et_4NBF_4**
R_s/Ω.cm²	6.37
CPE_1/ Ss^n.cm^{-2}	1.90E-03
n_1	1.00
R_1/ohm.cm²	5.65
CPE_2/Ss^n.cm^{-2}	1.48E-03
n_2	0.96
R_2/ohm.cm²	3.52E+04
Q_3/Ss^n.cm^{-2}	8.79E-06
n_3	0.62
R_3/ohm.cm²	7.44
Chi squared / χ^2	1.12E-03

Table S2 –Mott-Schottky Parameters for ProDOT derivatives.

GC/Polymer/Electrolyte	**NA1**	**EFB1**	**ND1**	**EFB2**
ProDOT-Et_4NBF_4	2.06E+21	0.14	-	-
ProDOT-Br-Et_4NPF_6	2.52E+21	0.33	8.64E+22	1.15
ProDOT-Br-$NaClO_4$	8.24E+21	0.93	-	-
PoDOT-Br-Et_4NBF_4	1.59E+21	0.26	-	-
ProDOT-OBz-Et_4NPF_6	1.65E+21	0.00	1.23E+22	1.24
ProDOT-OBz-$NaClO_4$	7.56E+21	1.10	-	-
PoDOT-OBz-Et_4NBF_4	1.90E+21	0.11	4.13E+22	1.17
ProDOT-OTs-Et_4NPF_6	1.30E+21	0.07	-	-
ProDOT-OTs-$NaClO_4$	4.04E+22	1.32	-	-
PoDOT-OTs-Et_4NBF_4	1.39E+21	0.36	-	-
ProDOT-OPh-$NaClO_4$	1.53E+20	0.28	-	-
GC/Polymer/Electrolyte	**NA1**	**EFB1**	**NA2**	**EFB2**
ProDOT-OPh-Et_4NPF_6	1.97E+21	0.57	2.65E+22	2.04
PoDOT-OPh-Et_4NBF_4	9.23E+20	1.22	2.39E+20	0.55