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Electrochemical Investigations of the Suitability of 1-Propyl-2,3-dimethylidazolium bis(trifluoromethylsulfonyl)imide as the Electrolyte for Application in Micro–Mesoporous Carbon-Electrode-Based Supercapacitors and Other Electrochemical Systems

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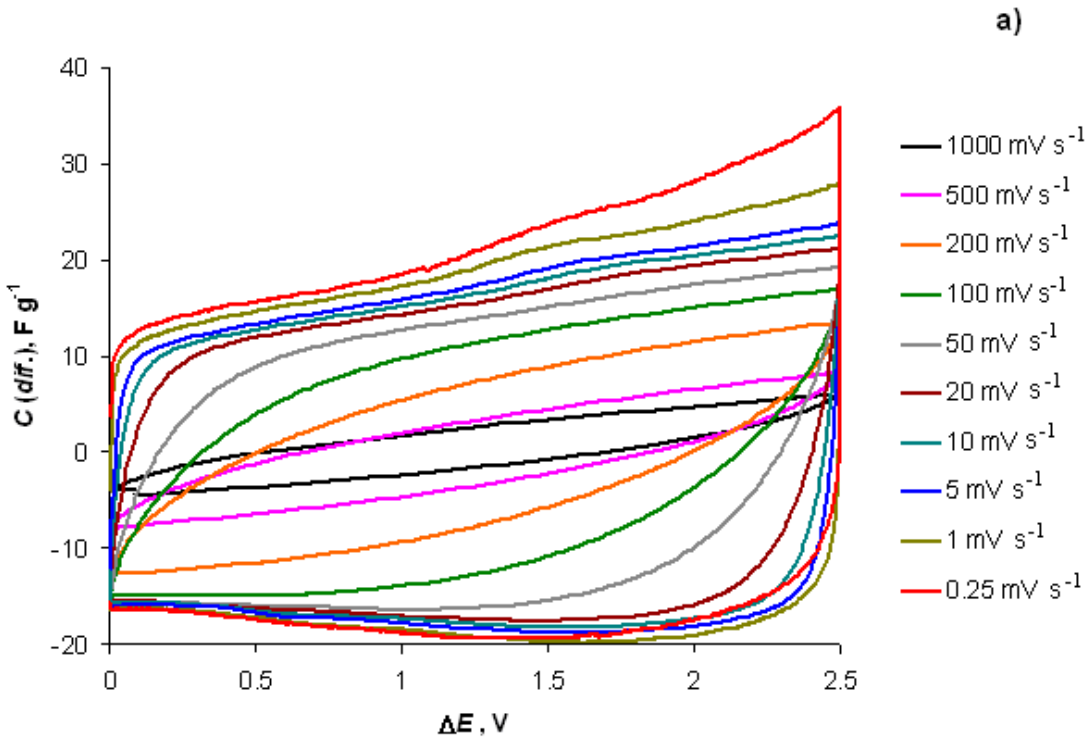


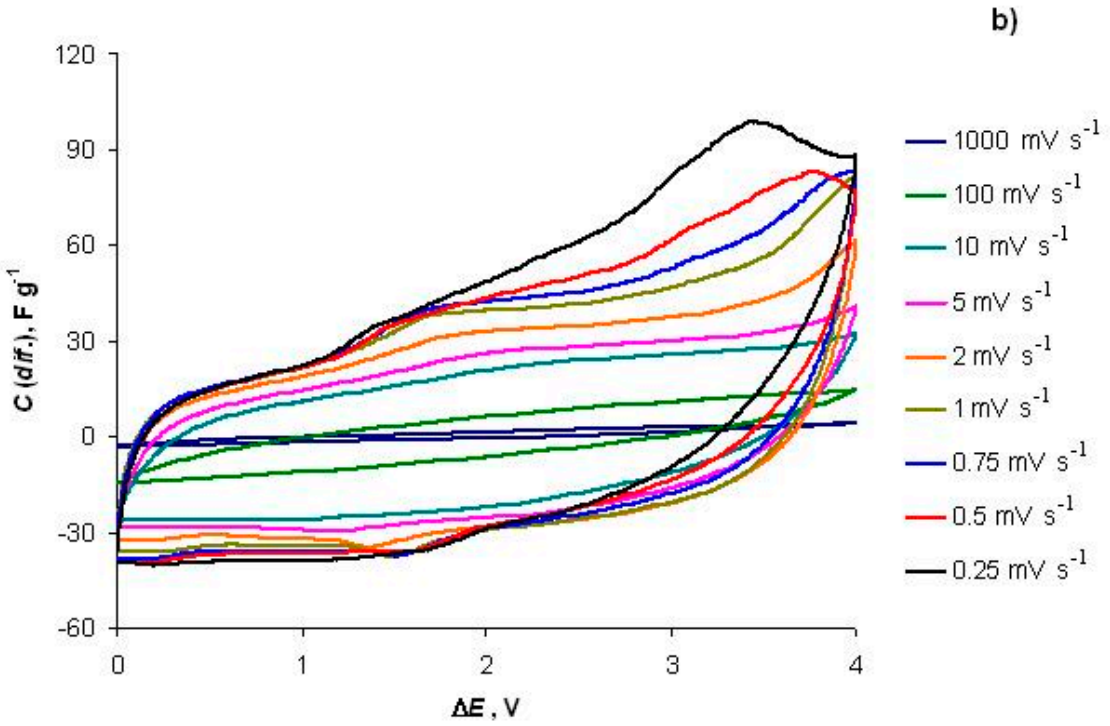


Figure S1. Measured gravimetric differential capacitance (*C*(*dif.*)) vs. applied cell potential (Δ*E*) cyclic voltammetry (CV) data for PMMIm(TFSI) | MMP-C(Mo_2C) system. CV curves measured at various potential sweep rates indicated in the figure. CVs are measured in the Δ*E* regions: a) – from 0.0 V to 2.5 V and b) – from 0.0 V to 4.0 V.

Table S1. Average gravimetric differential capacity (F g-1) of the investigated PMMIm(TFSI) | MMP-C(Mo2C) system during the charging cycles measured at various potential sweep rates (v) and for various polarization regions (CV E) investigated using cyclic voltammetry.

CV Δ*E*, V	v = 0.25 mV s^{-1}	v = 1.0 mV s^{-1}	v = 50 mV s^{-1}	v = 500 mV s^{-1}
0.5	N.A.	13	7	N.A.
1.0	15	14	10	N.A.
1.5	16	16	11	N.A.
1.75	17	17	11	N.A.
2.0	19	17	12	4
2.5	22	19	13	5
2.75	23	20	14	5
3.0	26	22	14	4
3.2	27	23	14	5
3.4	30	24	12	3

Table S2. Columbic efficiency (%) of investigated PMMIm(TFSI) | MMP-C(Mo_2C) system calculated at various potential sweep rates (v) and for various polarization regions (CV ΔE) applied during cyclic voltammetry.

CV ΔE, V	v = 0.25 mV s^{-1}	v = 1.0 mV s^{-1}	v = 50 mV s^{-1}	v = 500 mV s^{-1}
0.5	N.A.	100	98	N.A.
1.0	98	99	102	N.A.
1.5	95	98	104	N.A.
1.75	92	97	104	N.A.
2.0	90	97	101	104
2.5	79	92	100	99
2.75	77	92	100	99
3.0	70	87	100	99
3.2	76	89	100	99
3.4	68	88	99	108

Table S3. Columbic efficiency (%) of investigated EMIm(BF_4) | MMP-C(Mo_2C) system calculated at various potential sweep rates (v) and for various polarization regions (CV ΔE) applied during cyclic voltammetry.

CV ΔE, V	v = 0.25 mV s^{-1}	v = 1.0 mV s^{-1}	v = 50 mV s^{-1}	v = 500 mV s^{-1}
2.0	89	93	99	99
2.5	82	95	100	100
2.75	53	87	100	100
3.0	36	68	99	100
3.2	0.017	0.17	43	85
3.4	0.001	0.004	0.4	1.5

Table S4. Average gravimetric differential capacity (F g^{-1}) of the investigated EMIm(BF_4) | MMP-C(Mo_2C) system during the charging cycles measured at various potential sweep rates (v) and for various polarization regions (CV ΔE) investigated using cyclic voltammetry.

CV ΔE, V	v = 0.25 mV s^{-1}	v = 1.0 mV s^{-1}	v = 50 mV s^{-1}	v = 500 mV s^{-1}
2.0	21	20	17	13
2.5	24	21	19	14
2.75	16	25	20	15
3.0	44	32	22	15
3.2	1662	462	30	12
3.4	17667	5200	135	18

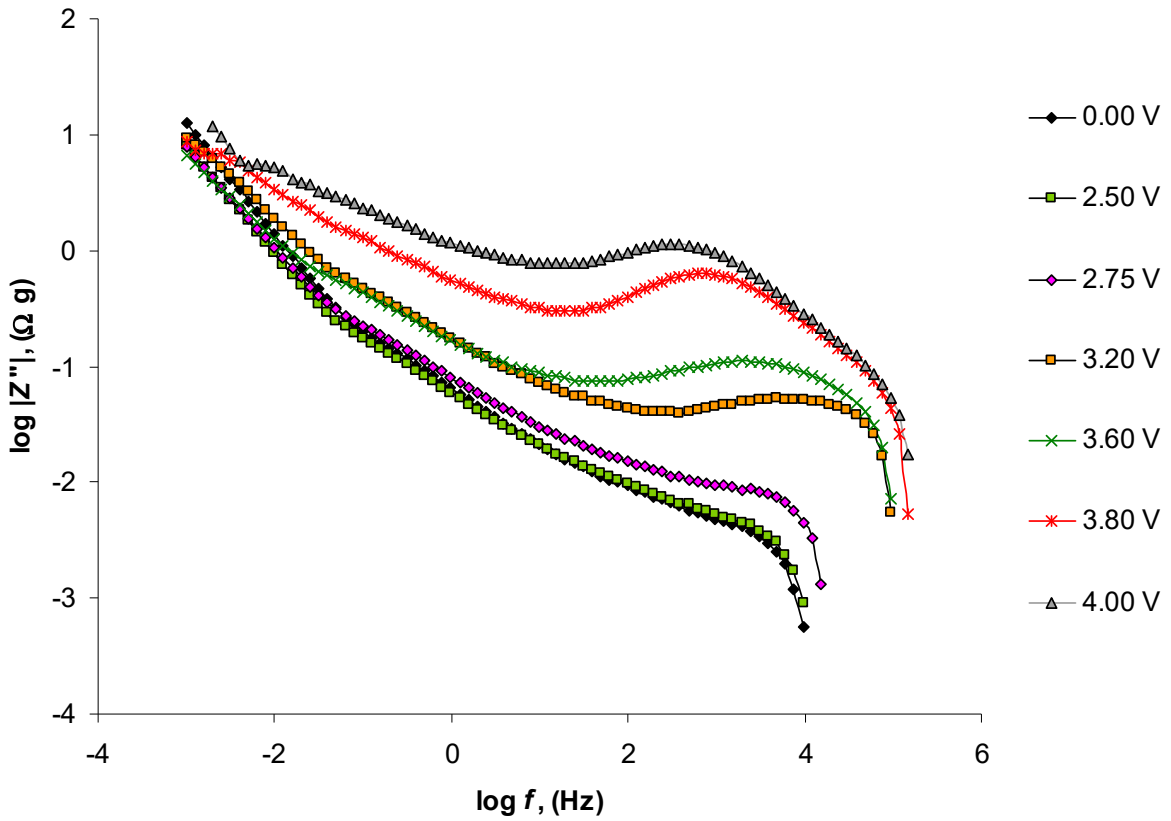
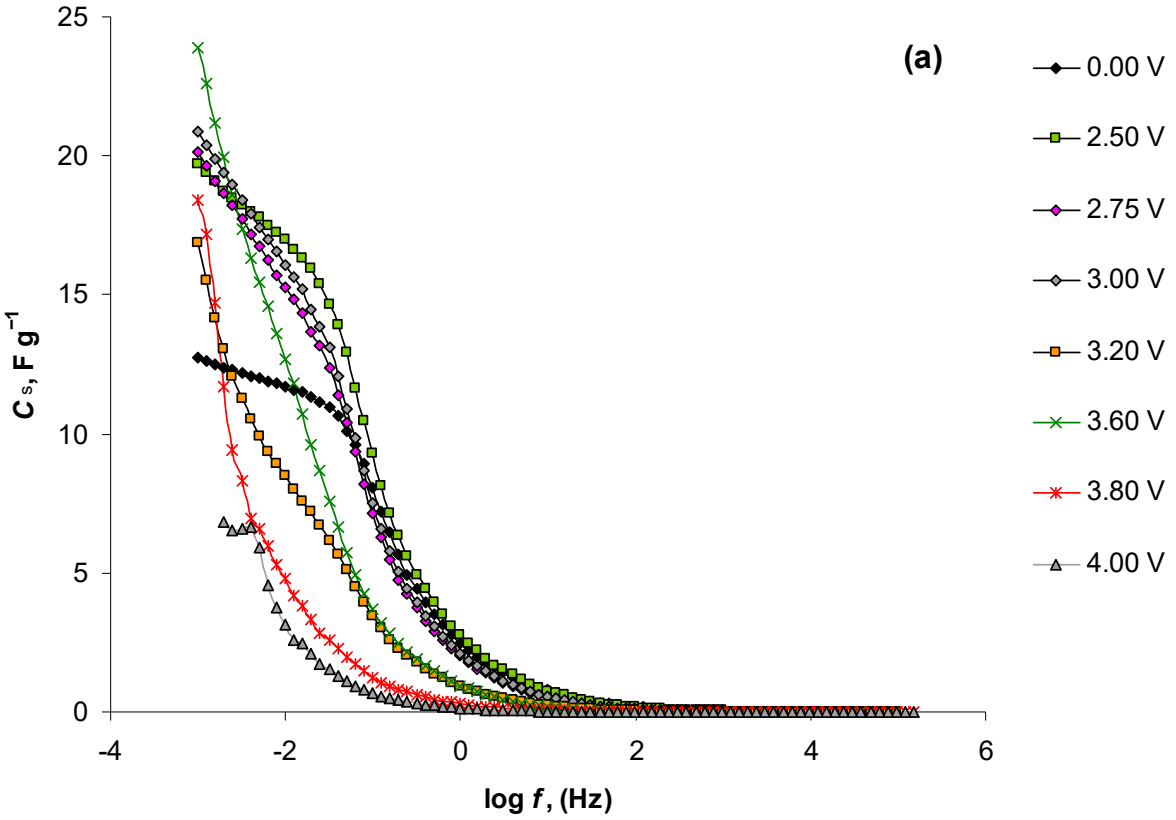
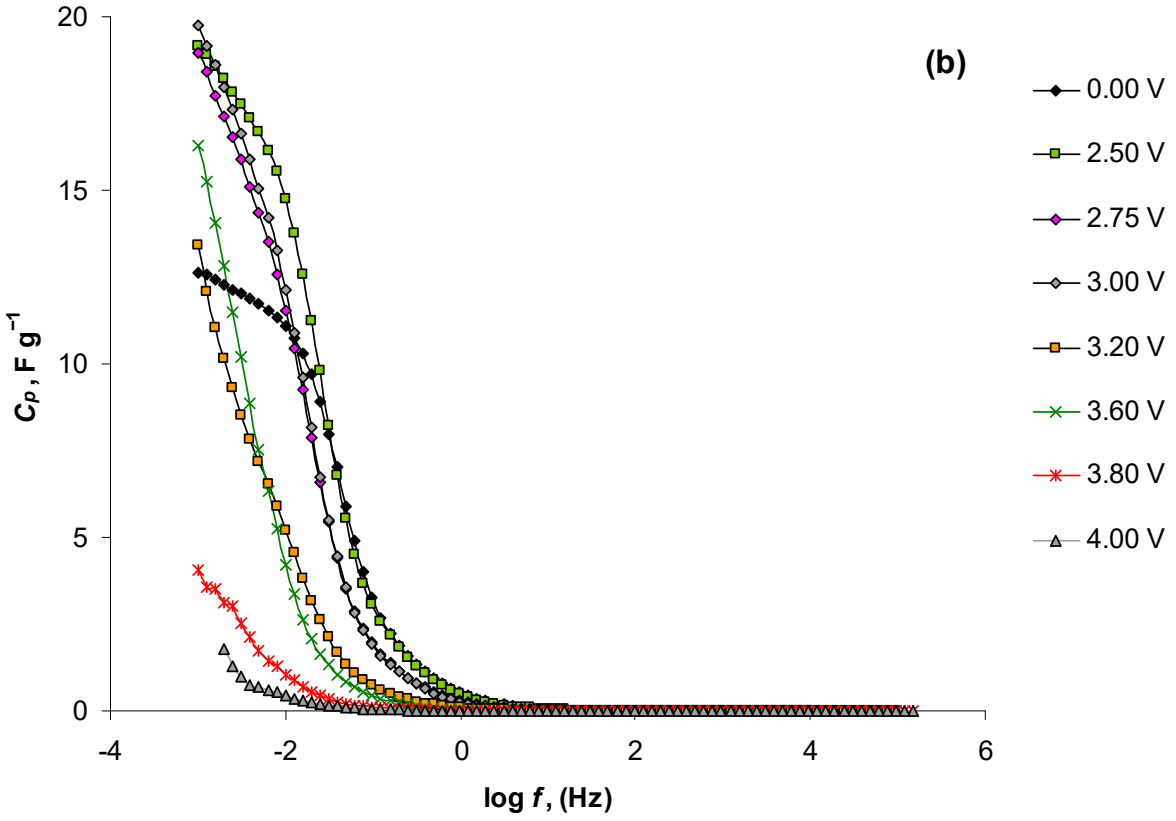
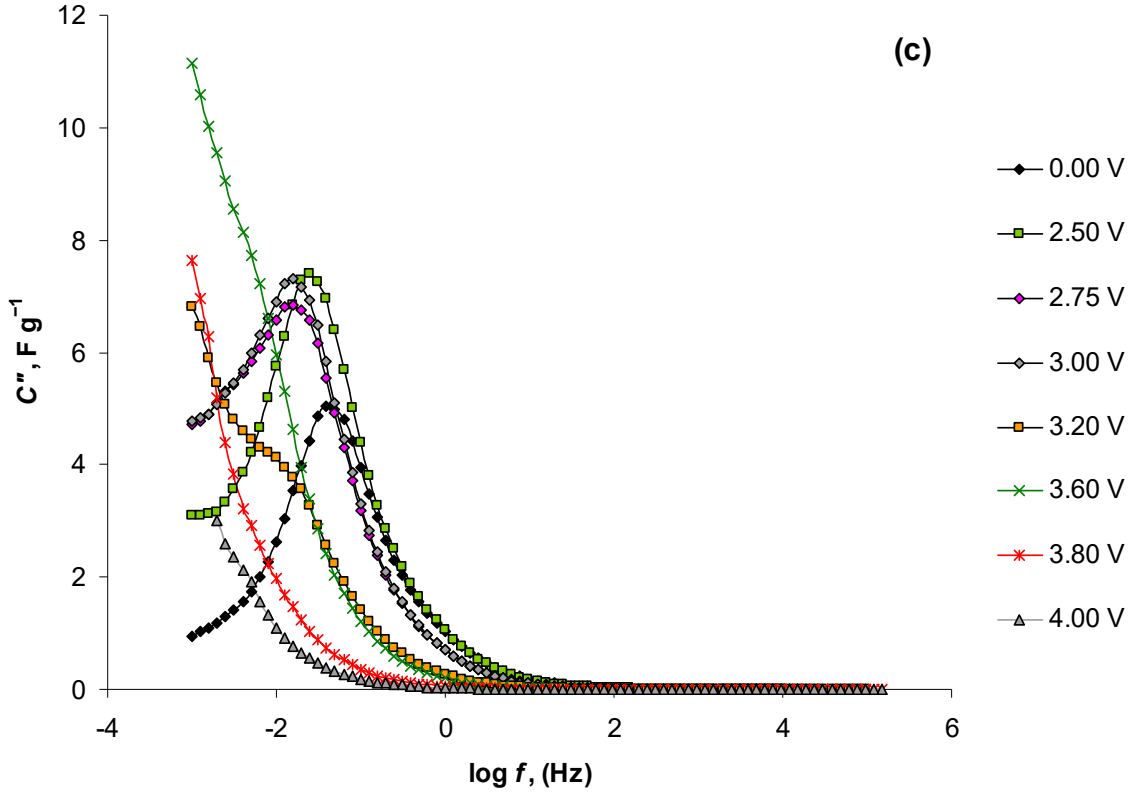


Figure S2. log |*Z*"| vs. log *f* relationship for PMMIm(TFSI) | MMP-C(Mo_2C) system measured at selected cell potentials shown in Fig.


(a)
C_s, F g^{-1}
log f, (Hz)
0.00 V
2.50 V
2.75 V
3.00 V
3.20 V
3.60 V
3.80 V
4.00 V


(b)
C_p, F g^{-1}
log f, (Hz)
0.00 V
2.50 V
2.75 V
3.00 V
3.20 V
3.60 V
3.80 V
4.00 V



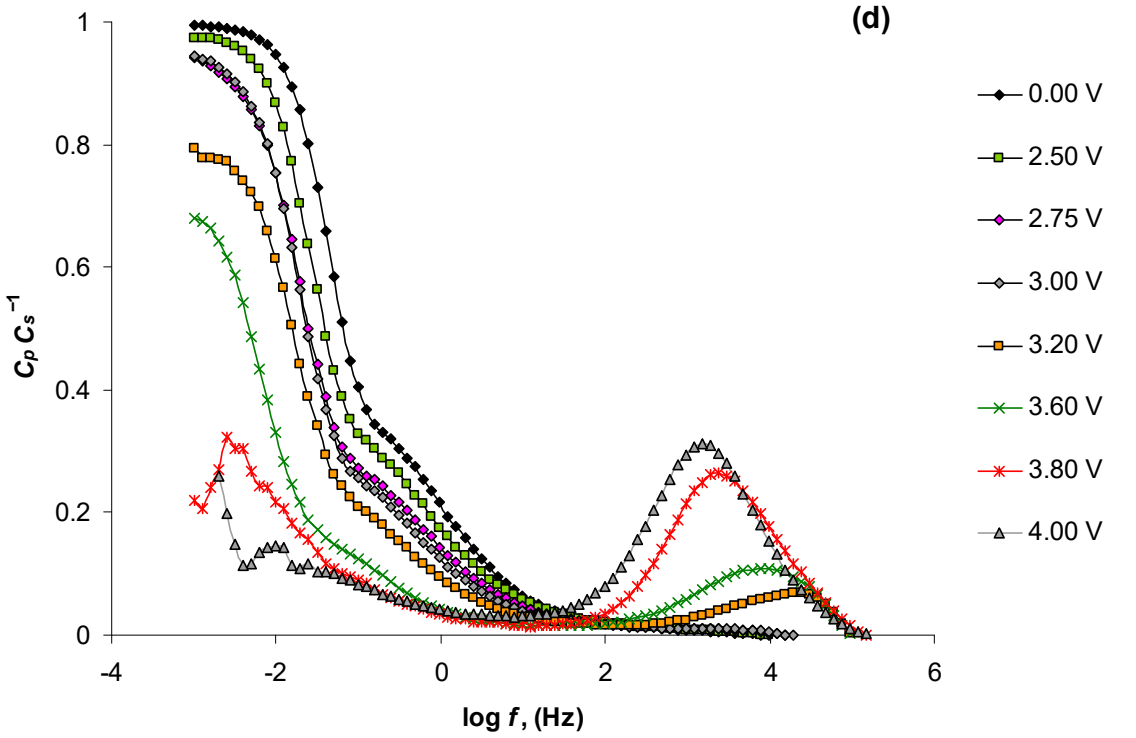


Figure S3. Series capacitance (C_s) (a), parallel capacitance (C_p) (b), imaginary capacitance (C'') (c) and $C_p\ C_s^{-1}$ (d) relationships upon the logarithm of the potential modulation frequency (f) applied shown for PMMIm(TFSI) | MMP-C(Mo_2C) system.