Supplementary Information

Novel Eutectogels Derived from an Ionic-Liquid-Based Deep Eutectic Solvent as Electrolytes for Supercapacitors: Synthesis and Characterization

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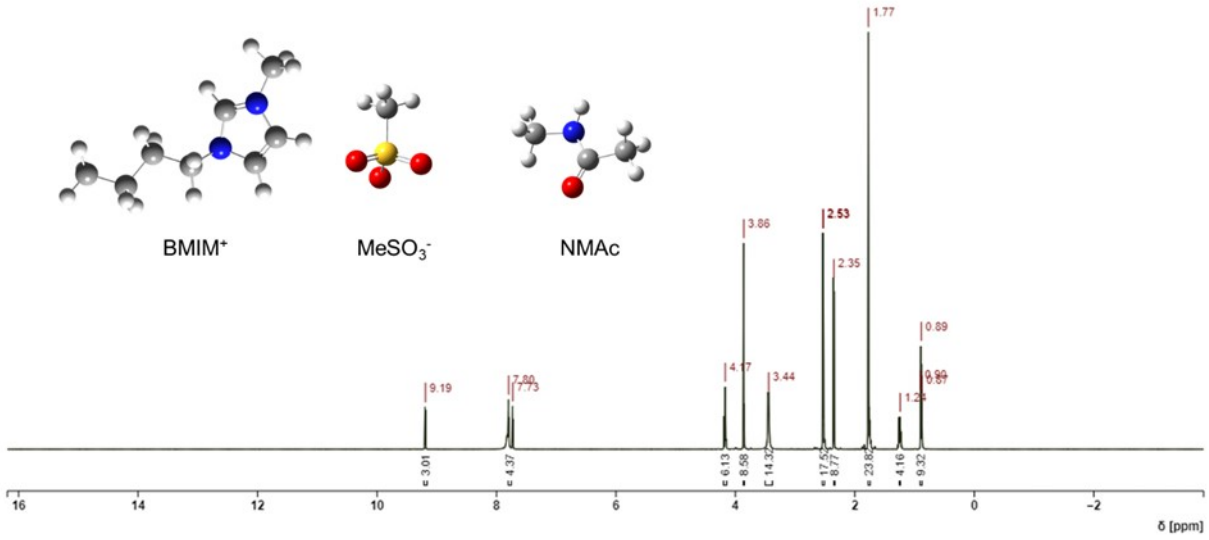

Fig. S1. ^{1}H NMR spectrum of the DES.

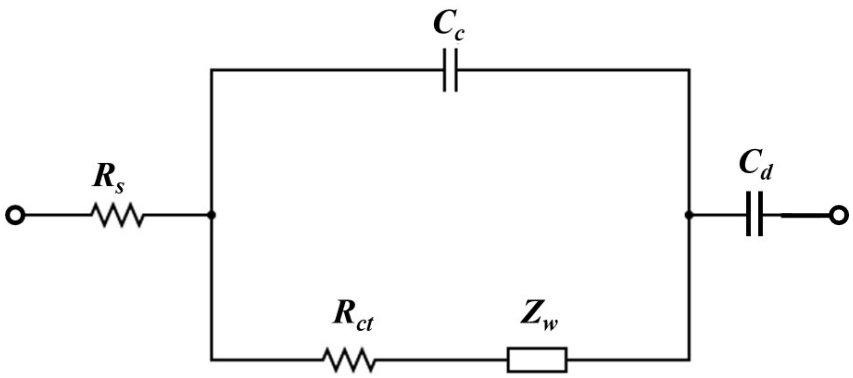

Fig. S2. Equivalent electrical circuit corresponding to a typical Nyquist plot obtained from EIS.

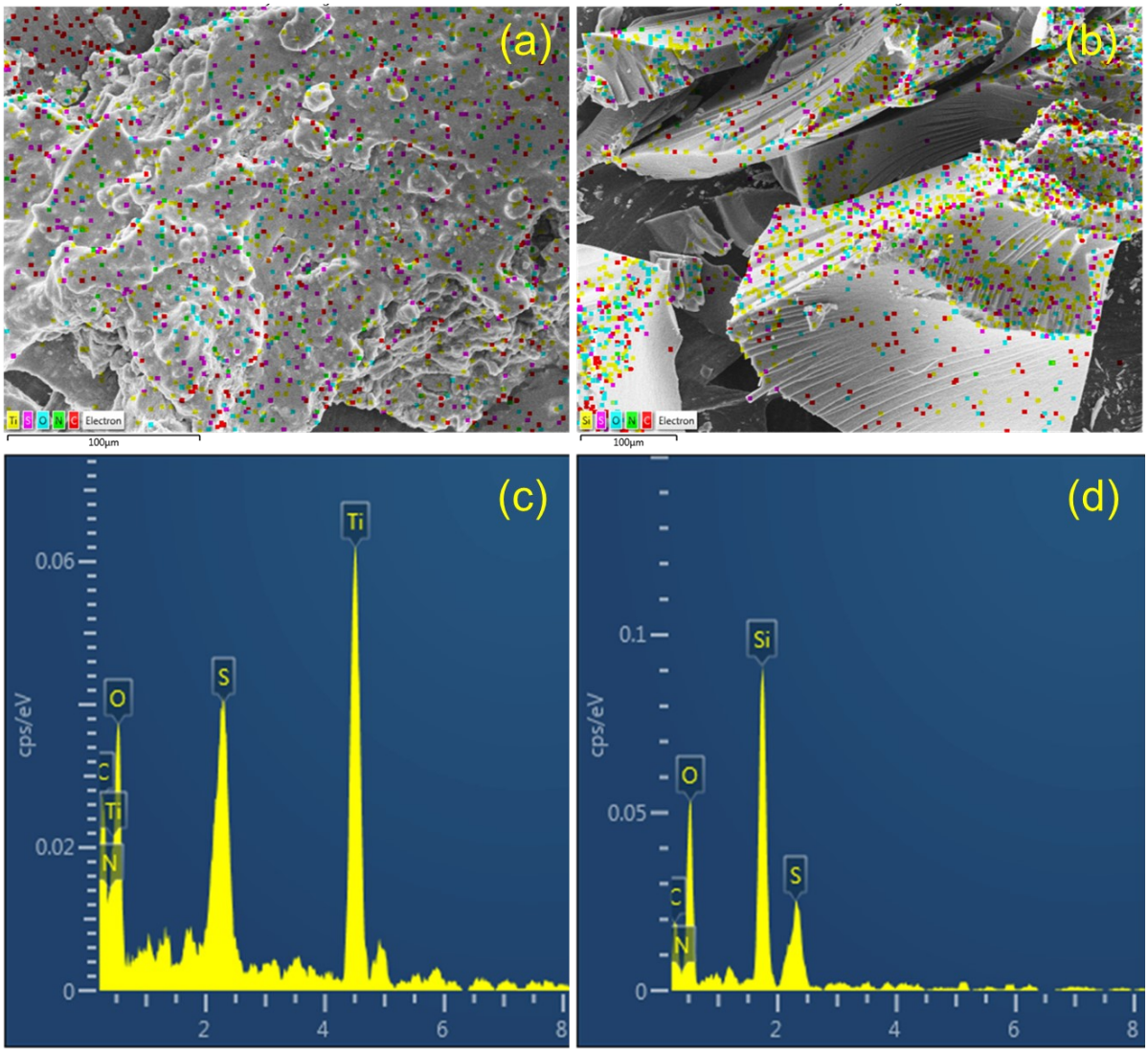

Fig. S3. Spot analyses of the (a) TIEGel and (b) SIEGel samples showing the spectral regions EDX is conducted on; EDX spectra of (c) TIEGel and (d) SIEGel showing the peaks corresponding to the different elements present in the samples.

Table S1. Comparison of OPW, specific capacitance, specific energy, specific power, and ionic conductivity of TIEGel and SIEGel with those of pertinent ionogels and eutectogels reported in similar works at room temperature.

System	Electrodes / Working electrode	OPW (V)	*C* (F g^{-1})	*E* (W h kg^{-1})	*P* (kW kg^{-1})	σ (mS cm^{-1})	Ref.
[BMIM][$MeSO_3$] + NMAc + TiO_2 (TIEGel)	rGO | rGO	3	16.32 (5 mV s^{-1})	20.39	3.31	1.27	This work
[BMIM][$MeSO_3$] + NMAc + SiO_2 (SIEGel)	rGO | rGO	3	2.25 (5 mV s^{-1})	2.81	0.31	0.09	This work
[BMIM][BF_4] + DMAA + TiO_2	carbon nanocage	~3	176 (1 A g^{-1})	-	-	3.5	1
[BMIM][PF_6] + PEGMA + PEGDA + TiO_2	carbon nanocage	3	172 (1 A g^{-1})	-	-	1.46	2
[BMIM][BF_4] + DMAA + MBAA + TiO_2	Activated carbon (AC)	~3	143 (1 A g^{-1})	-	-	3.5	3
[BMIM][BF_4] + HEMA + TiO_2	Au-Ti-coated AC	~3	102 (5 mV s^{-1})	-	-	1.4	4
[EMIM][TFSI] + SiO_2	glassy carbon	2.5	7.5 ± 0.4*	-	-	9.3 ± 0.5	5
[EMIM][TFSI] + SiO_2	Vertically aligned carbon nanotubes	3	430* (100 mV s^{-1})	0.1–0.5†	10‡	-	6
[EMIM][TFSI] + SiO_2	AC	2.5	20 (2 mV s^{-1})	-	-	1.5	7
[EMIM][TFSI] + SiO_2	carbon monolith	2.5	75 (10 mV s^{-1})	-	-	-	8
[EMIM][TFSI] + DMDMS + SiO_2	Si nanowires	2.5	4	-	-	3	9
ChCl + EG + HEMA + PEGDA	Indium tin oxide (ITO) | ITO	1.5	33.3 (0.01 A g^{-1})	15.8	-	5.7	10
ChCl + urea + glycerol + cellulose +	AC | AC	2	76.6 (1 A g^{-1})	10.64	0.5	0.58	11

PAAM							
EG + urea + ChCl +$ZnCl_2$ + silk fiber	Zn | AC	1.4	342.8 (0.2 A g^{-1})	93.3	-	12.31	12
$Zn(ClO_4)_2$ + AM + H_2O	Zn | N-rGO	2.2	194.7 (0.8 A g^{-1})	117.5	~ 0.83	51.7	13
EG + $Zn(ClO_4)_2$ + H_2O +SPEEK + PAAM	Zn | AC	1.7	150.1 (0.3 A g^{-1})	66.83	~ 0.19	63.5	14

**Areal capacitance ($\mu F\ cm^{-2}$)*

†*Areal energy density ($\mu W\ h\ cm^{-2}$)*

‡ *Areal power density ($mW\ cm^{-2}$)*

Table S2. Specific capacitance and specific energy of TIEGel and SIEGel at room temperature and scan rates of 5, 10, 25, 50, and 100 mV s^{-1}.

System	**Scan rate ($mV\ s^{-1}$)**	***C*** **($F\ g^{-1}$)**	***C*** **($mF\ cm^{-2}$)**	***E*** **($W\ h\ kg^{-1}$)**
TIEGel	5	16.32	395.78	20.39
	10	10.12	245.41	12.65
	25	4.99	121.05	6.24
	50	2.77	67.30	3.45
	100	1.57	38.09	1.96
SIEGel	5	2.25	54.53	2.81
	10	1.83	44.37	2.29
	25	0.96	23.39	1.21
	50	0.53	12.99	0.67
	100	0.29	6.97	0.36

Table S3. Specific capacitance and specific energy of TIEGel at scan rates of 5, 10, 25, 50, and 100 mV s^{-1} and controlled temperatures of 25, 50, and 80 °C.

Temperature (ºC)	**Scan rate (mV s^{-1})**	***C*** **(F g^{-1})**	***C*** **(mF cm^{-2})**	***E*** **(W h kg^{-1})**
25	5	8.49	205.84	10.61
	10	5.34	129.47	6.67
	25	2.33	56.53	2.91
	50	1.03	24.98	1.29
	100	0.35	8.50	0.44
50	5	16.39	397.53	20.49
	10	8.74	212.06	10.93
	25	4.24	102.85	5.30
	50	2.29	55.44	2.86
	100	0.98	23.79	1.23
80	5	25.81	625.97	32.26
	10	18.40	446.39	23.00
	25	10.79	261.80	13.49
	50	6.51	157.82	8.13
	100	3.39	82.13	4.23

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