Structural Supercapacitor Electrolytes Based on Bicontinuous Ionic Liquid - Epoxy Resin Systems *ⁱ

By Natasha Shirshova,*Alexander Bismarck, Shuaijin Carreyette, Quentin P.V. Fontana, Emile S. Greenhalgh, Per Jacobsson, Patrik Johansson, Maciej J. Marczewski, Gerhard Kalinka, Anthony Kucernak, Johan Scheers, Milo S.P. Shaffer,^{*} Joachim H.G. Steinke and Malte Wienrich



Figure SI1. Thermogravimetric (TG) and derivative thermogravimetric (DTG) curves for the cured formulations of (a) VTM266/50; (b) MTM57/50 and (c) MVR444/50.

Table SI 1. Therma	l degradation	data for the	cured epoxy	based systems
--------------------	---------------	--------------	-------------	---------------

Sample	T _{5wt.%} [°C]	$T_{20wt.\%}[^{\circ}C]$	T _{50wt.%} [°C]	Char yield at
				550°C [wt.%]
MTM57/100	364	390	421	10.6
MTM57/50	326	390	421	9.2
MVR444/100	346	385	407	8.3
MVR444/50	327	358	416	11.8
MVR444/40	337	365	420	12.2
MVR444/30	331	374	428	9.7
VTM266/100	333	384	418	10.0
VTM266/50	330	377	420	11.4



Figure SI 2. Deconvoluted Raman spectra at room temperature of VTM266/50 at 720-780 cm⁻¹ region. Experimental data are marked as open circles. (a); Comparison of the normalized Raman spectra at room temperature of EMIM TFSI doped with LiTFSI (dotted line) and VTM266/50 at 720-770 cm⁻¹ region. (b)



Figure SI 3. Deconvoluted Raman spectra at room temperature of MTM57/50 at 720-780 cm⁻¹ region. Experimental data are marked as open circles. (a); Comparison of the normalized Raman spectra at room temperature of EMIM TFSI doped with LiTFSI (dotted line) and MTM57/50 at 720-770 cm⁻¹ region. (b)



Figure SI 4. Deconvoluted Raman spectra at room temperature of MVR444/50 at 720-780 cm⁻¹ region. Experimental data are marked as open circles. (a); Comparison of the normalized Raman spectra at room temperature of EMIM TFSI doped with LiTFSI (dotted line) and MVR444/50 at 720-770 cm⁻¹ region. (b)



Figure SI 5. Ionic conductivity and Young's modulus of samples MVR444/50, VTM266/50 and MTM57/50. Flexural modulus of the neat epoxy resins are 3.22 GPa, 2.66 GPa and 2.73 GPa for MVR444, VTM266 and MTM57 respectively; lit. - (BADGE/TetradX/TEPA: IL (57:43)¹⁵.





Figure SI 6. SEM micrographs of samples containing different amounts of MTM57: MTM57/45 (a); MTM57/55 (b), (all samples are after extraction of the electrolyte).

ⁱ In memoriam of Dr. Joachim H.G. Steinke and Prof. Per Jacobsson