

Supplementary Information for

Safe propylene carbonate/water hybrid electrolyte for supercapacitor

Chenhao Dong,^a Wei Kang,^a Cuihua An^{a,b*}

a Tianjin Key Laboratory of Advanced Functional Porous Materials, Institute for New Energy Material & Low-Carbon Technologies, School of Materials Science and Engineering, Tianjin University of Technology, Tianjin 300384, P.R. China

b Key Laboratory of Advanced Energy Materials Chemistry (MOE), College of Chemistry, Nankai University, Tianjin 300071, P.R. China

*E-mail: ancuihua@tjut.edu.cn

Table S1 Mass ratio of each component of different concentrations of electrolyte

| | 3 M | 5 M | 7 M | 10 M | 14 M |
|----------------------------------|------|------|------|------|------|
| LiTFSI (g) | 6.03 | 6.03 | 6.03 | 6.03 | 6.03 |
| H ₂ O (g) | 1 | 1 | 1 | 1 | 1 |
| PC (g) | 6 | 3.2 | 2 | 1.1 | 0.5 |
| mass ratio (PC/H ₂ O) | 6 | 3.2 | 2 | 1.1 | 0.5 |

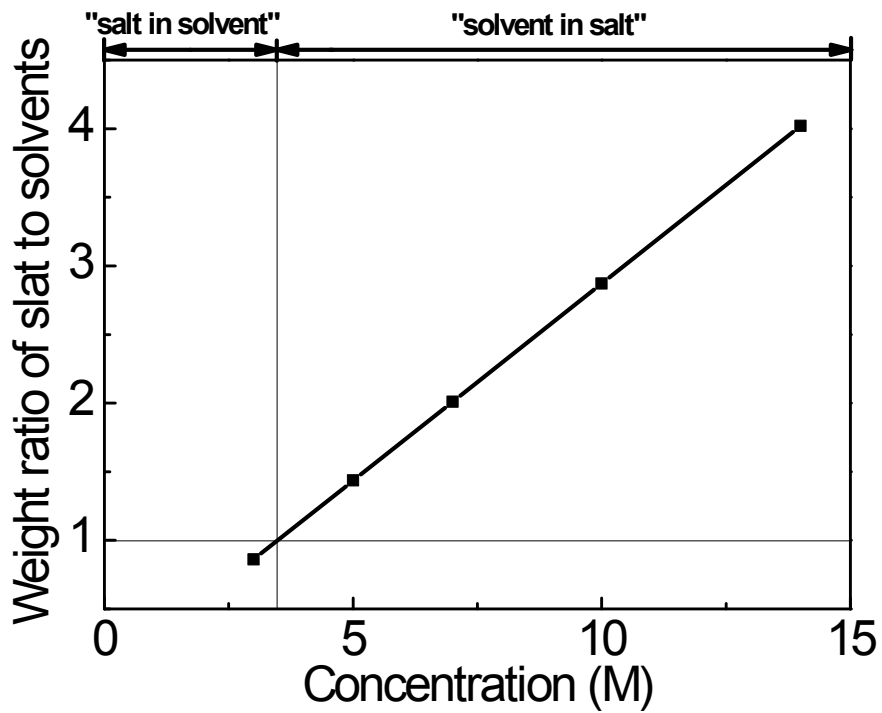


Fig. S1 The weight ratio of salt (LiTFSI) to solvents (Propylene carbonate/Water) as a function of the concentrations for various electrolytes.

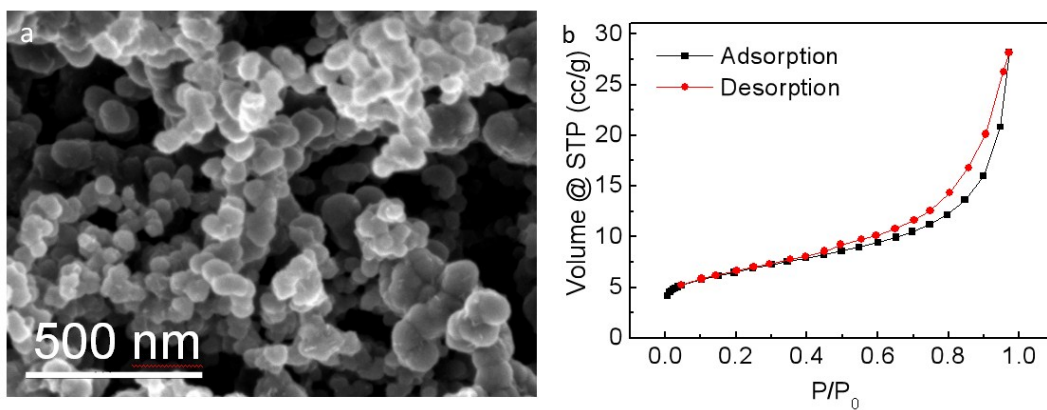


Fig. S2 Characterization of acetylene black. (a) SEM image and (b) Nitrogen adsorption-desorption isotherm.

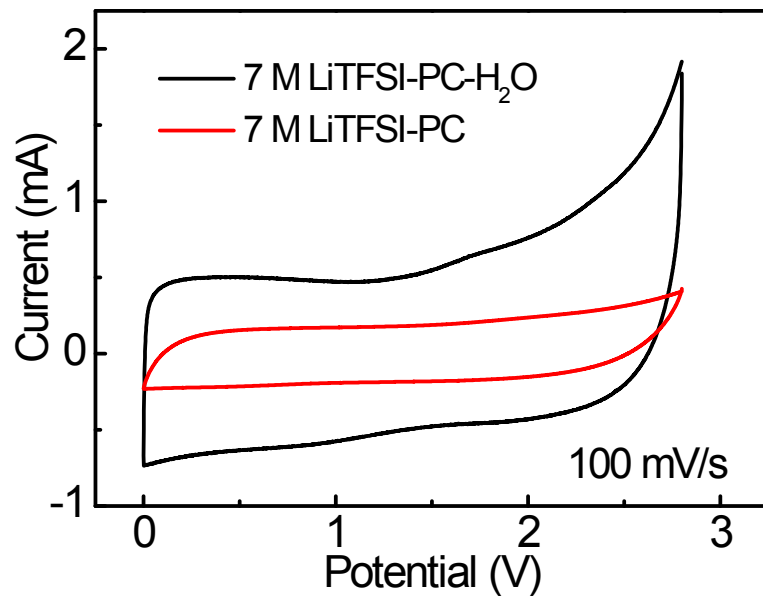


Fig. S3 Comparison of the CV curves of the SC using 7 M LiTFSI-PC/H₂O electrolyte and the supercapacitor using 7 M LiTFSI-PC electrolyte at an operation voltage of 2.8 V .

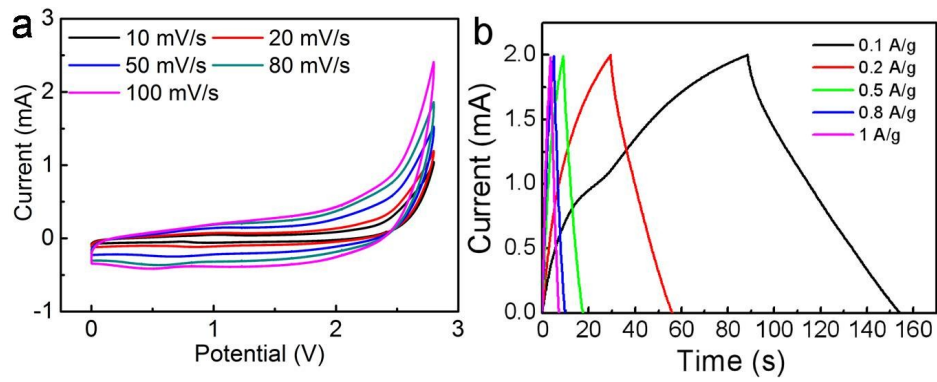


Fig. S4 The electrochemical performances of the AB electrode in 21 M LiTFSI-H₂O electrolyte. (a) CV curves at different sweep speeds and (b) GCD curves at different current densities.

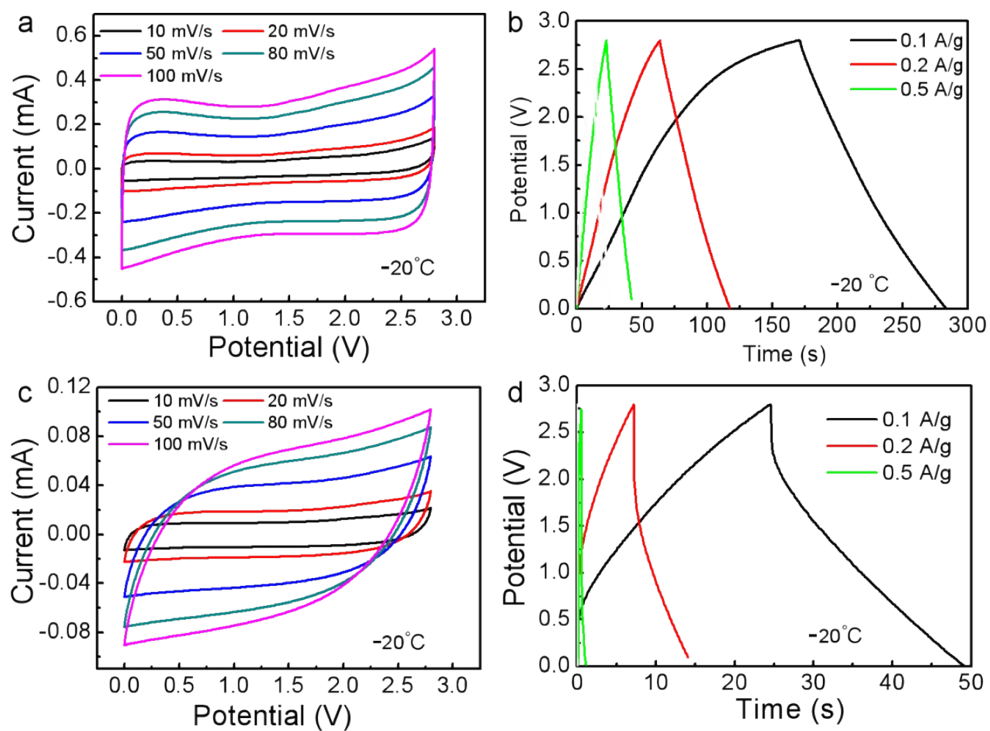


Fig. S5 The AB electrode in the 7 M LiTFSI-PC/H₂O electrolyte at -20 °C. (a) CV curves at different sweep speeds and (b) GCD curves at different current densities. The AB electrode in 7 M LiTFSI-PC electrolyte at -20 °C. (c) CV curves at different sweep speeds and (d) GCD curves at different current densities.

Table S2 Voltage window corresponding to different electrolytes.

| Electrode | Electrolyte | Voltage window | Reference |
|--|--|----------------|-----------|
| AB | 7 M LiTFSI-PC/H ₂ O | 2.8 V | This work |
| MnO ₂ /rGO | 1 M Na ₂ SO ₄ | 2.1 V | 1 |
| LiR-NMC | 0.3 M LiTFSI in [EC/DMC + PYR ₁₃ TFSI + FEC] | 2.3 V | 2 |
| NiO | [DHPMIM][OH] IL | 1.1 V | 3 |
| rGO | SCIL10 | 1.9 V | 4 |
| Graphite and rGO | Et ₄ NBF ₄ | 1.2 V | 5 |
| Pt | 32 M KCH ₃ COO +8 M LiCH ₃ COO | 2.7 V | 6 |
| NaTi ₂ (PO ₄) ₃ /Na _{0.66} [Mn _{0.66} Ti _{0.34}]O ₂ | 9.26 M NaOTF-H ₂ O | 2.14 V | 7 |

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