

Batteries & Supercaps

Supporting Information

Mechanically Stable UV-Crosslinked Polyester-Polycarbonate Solid Polymer Electrolyte for High-Temperature Batteries

Isabell L. Johansson, Daniel Brandell, and Jonas Mindemark*© 2020 The Authors. Published by Wiley-VCH Verlag GmbH & Co. KGaA. This is an open access article under the terms of the Creative Commons Attribution Non-Commercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes. An invited contribution to a Special Collection on Electrolytes for Electrochemical Energy Storage

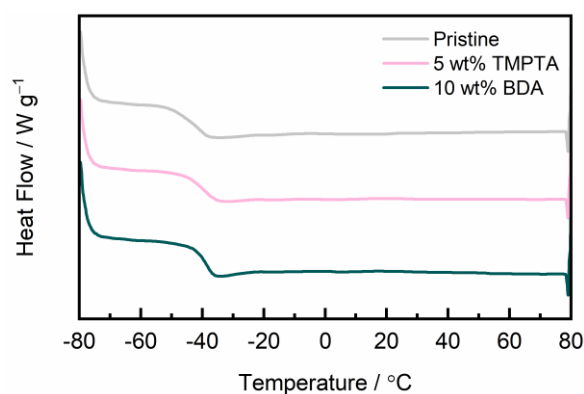


Figure S1. Differential scanning calorimetry curves from the second heating step of the pristine SPE (grey), and cross-linked films containing 5 wt% TMPTA (pink) and 10 wt% BDA (green), respectively. All SPEs contain 20 wt% LiTFSI, the cross-linked samples also contain 5 wt% DMPA. Measurements are performed between -80°C and 80°C , at a heating rate of $10^{\circ}\text{C}/\text{min}$ and cooling rate of $5^{\circ}\text{C}/\text{min}$.

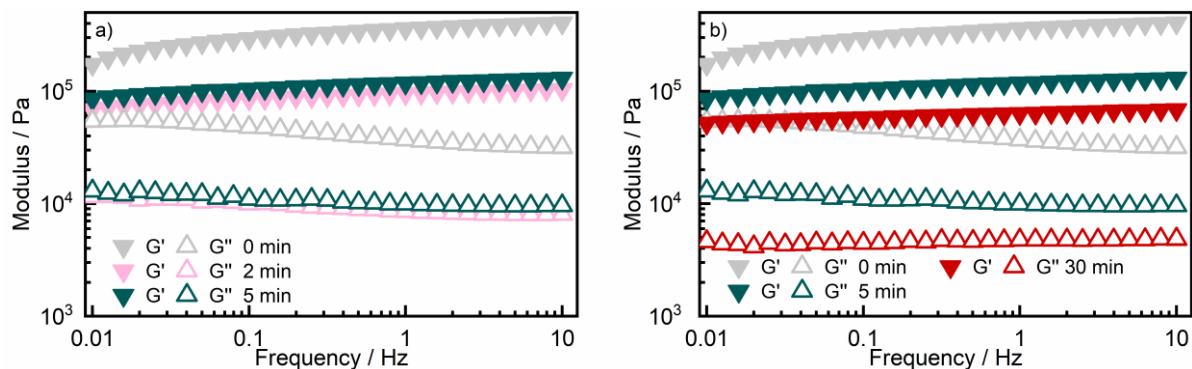


Figure S2. Rheological measurements of poly(CL-*co*-TMC) with irradiation times from 0 min to 30 min. The polymer films contain 20 wt% LiTFSI, 10 wt% BDA and 5 wt% DMPA.

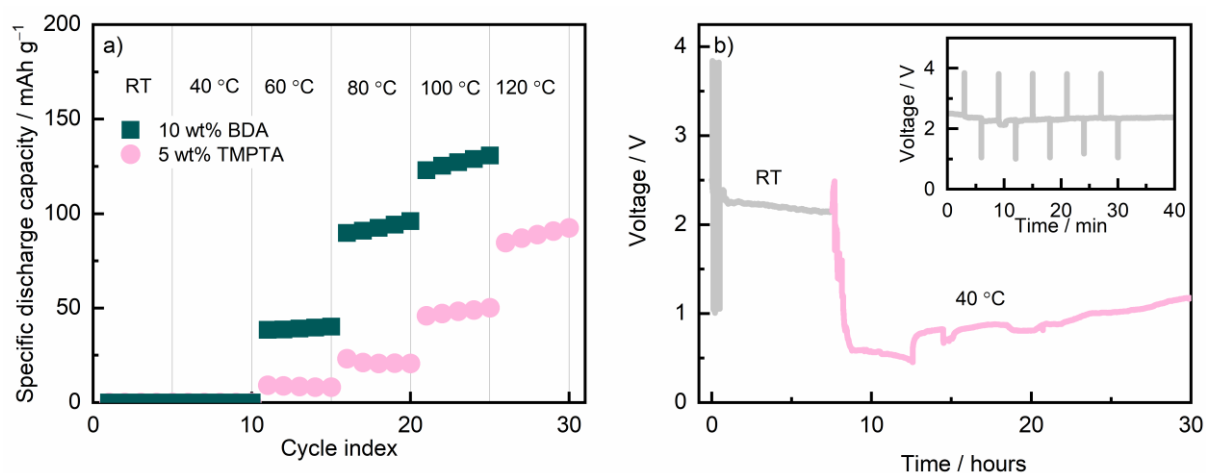


Figure S3. Cycling of Li || LiFePO₄ cells with polymer electrolyte films at C/2 (0.17 mA cm⁻² for the cross-linked films and 0.09 mA cm⁻² for the non-cross-linked sample) from room temperature to 120 °C, showing a) the specific capacity from room temperature to 120 °C and b) the voltage profile of the pristine sample from room temperature to 40 °C. Following a 5 h rest the cells were allowed to perform five cycles at each temperature, and the temperature was increased by 20 °C every 24 h.

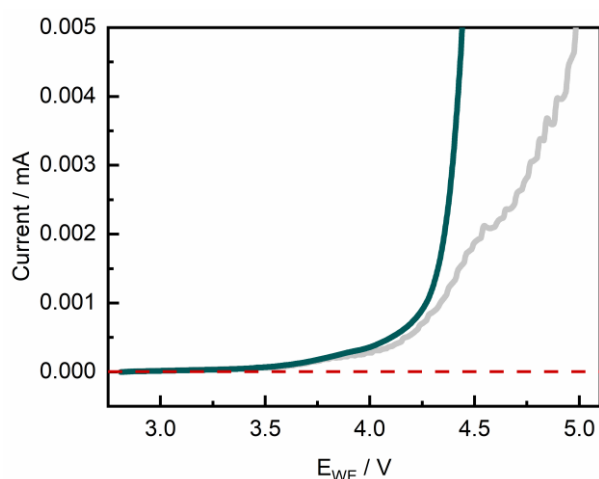


Figure S4. Linear scan voltammetry curves of poly(CL-co-TMC) with 20 wt% LiTFSI (grey) and poly(CL-co-TMC) with 20 wt% LiTFSI, 10 wt% BDA, and 5 wt% DMPA UV-irradiated for 5 min (green). The dashed red line shows 0 mA. Measurements were performed at 80 °C at a scan rate of 0.1 mV s⁻¹, with the SPE sandwiched between a lithium foil and carbon-coated aluminium.

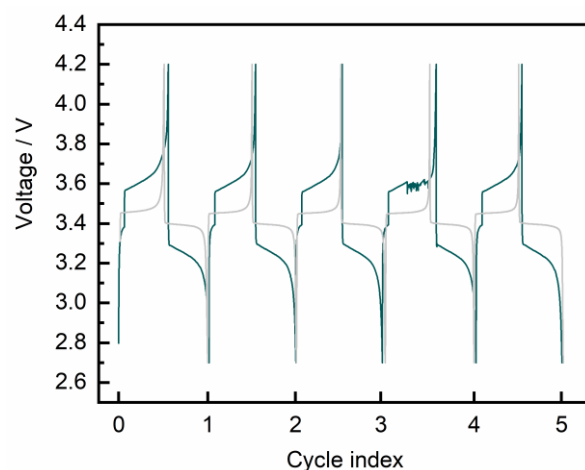


Figure S5. Cycling curves of Li || LiFePO₄ cells with polymer electrolyte films at 1.5C (green) and C/10 (grey).

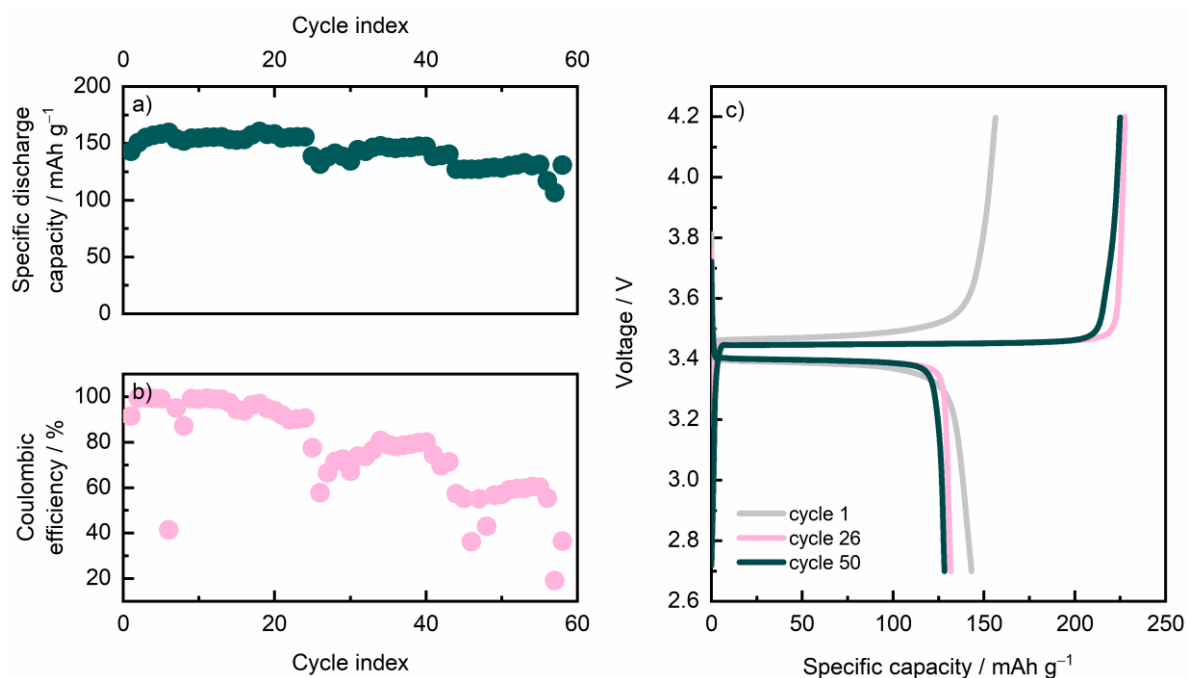


Figure S6. Cycling of a Li || LiFePO₄ cell with poly(CL-co-TMC) containing 20 wt% LiTFSI at 60 °C and C/10. The cell stopped cycling after 58 cycles.