Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Sodium 4-styrenesulfonyl(trifluoromethylsulfonyl) imide-based Single-Ion Conducting Polymer Electrolyte Incorporating Molecular Transporters for Quasi-Solid-State Sodium Batteries

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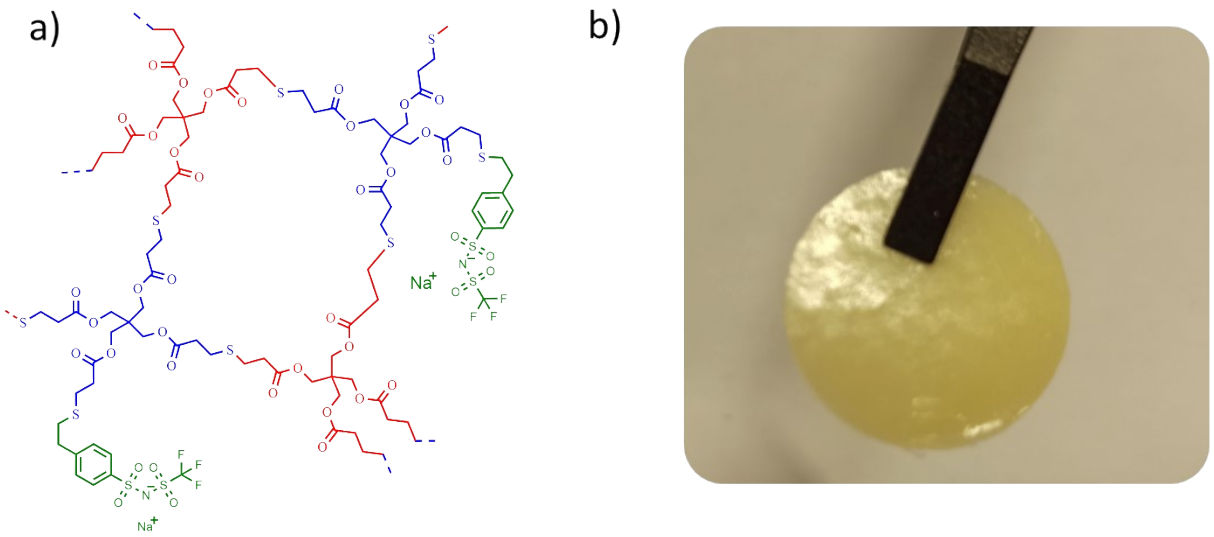

Figure S1. a) Cross-linked structure (NaSTFSI in green, PETMP in blue, and PET4A in red) and b) self-standing SIPE membrane images of NaSTFSI-co-PET-MP/4A.

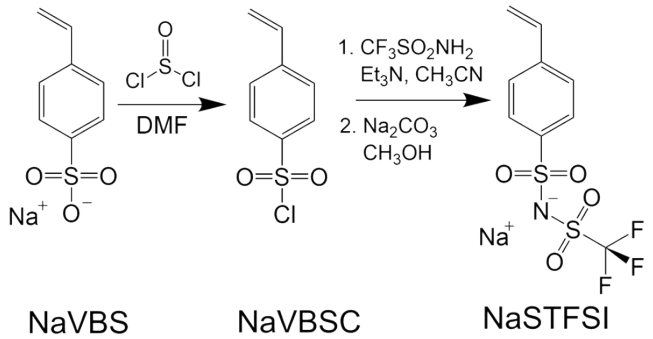

Figure S2. Scheme of a two-step synthesis route for sodium 4-styrene sulfonyl (trifluoromethyl sulfonyl) imide.

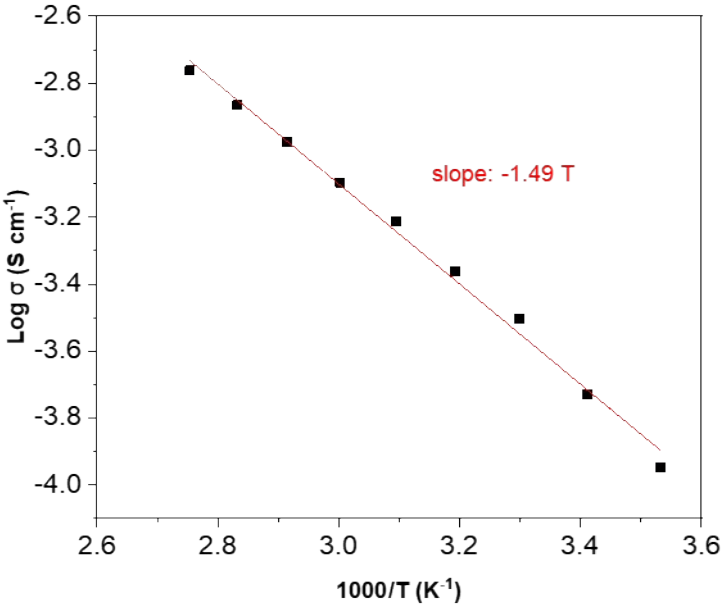

Figure S3. The logarithmic plot of the conductivity vs. 1000/T. The obtained slope is -1.49 T, which can be multiplied with $-8.6 \cdot 10^{-5}$ eV T^{-1}, resulting in an activation energy of 0.13 eV.

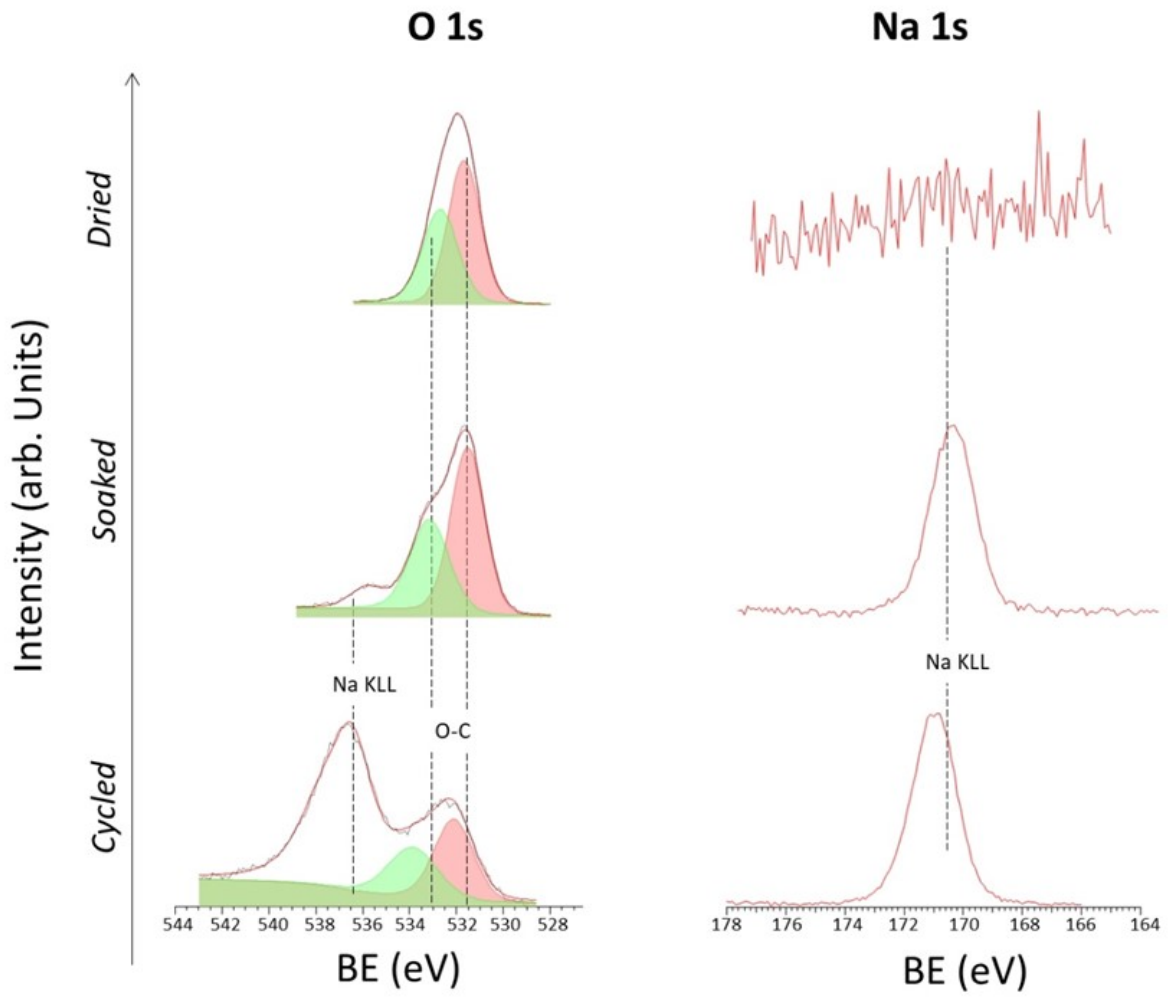

Figure S4. *Ex-situ* XPS spectra of O 1s and Na 1s of NaSTFSI-co-PET-MP/4A electrolyte surface after cycling for 5 cycles in a Na | Na symmetric cell under 10 μA cm^{-2}.

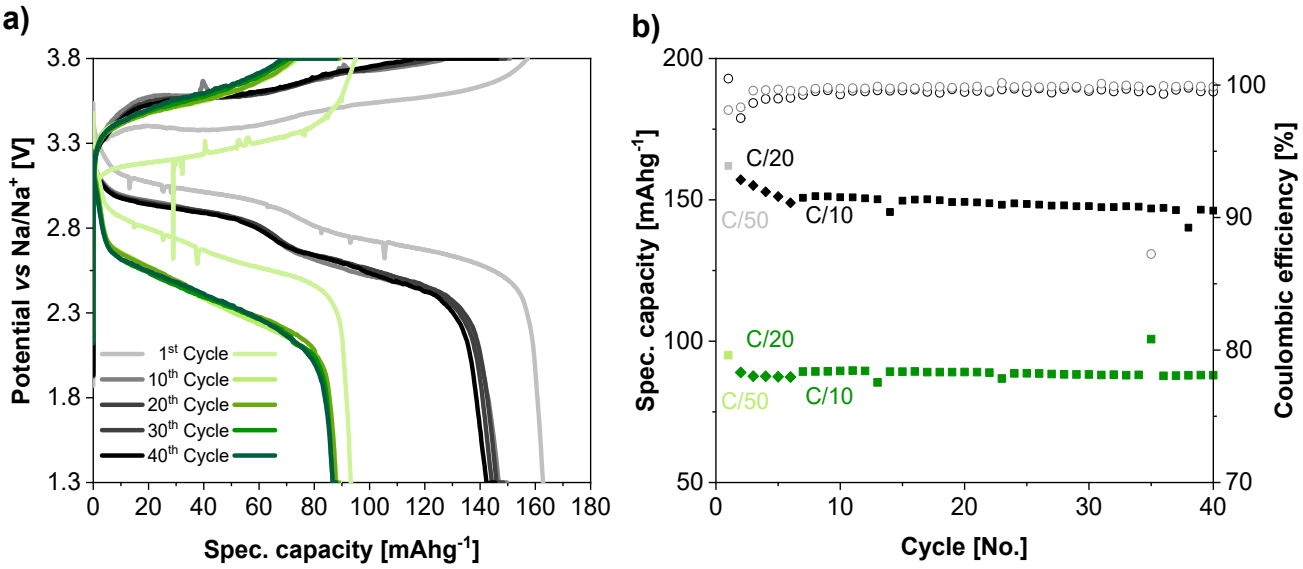

Figure S5. a) Voltage profile and b) cycling performance of hydrated (green) and dehydrated (black) PW cathode using NaSTFSI-co-PET-MP/4A polymer electrolyte at 40 °C.