

Supporting information

Fast Li⁺ transfer scaffold enables stable high-rate all-solid-state Li metal batteries

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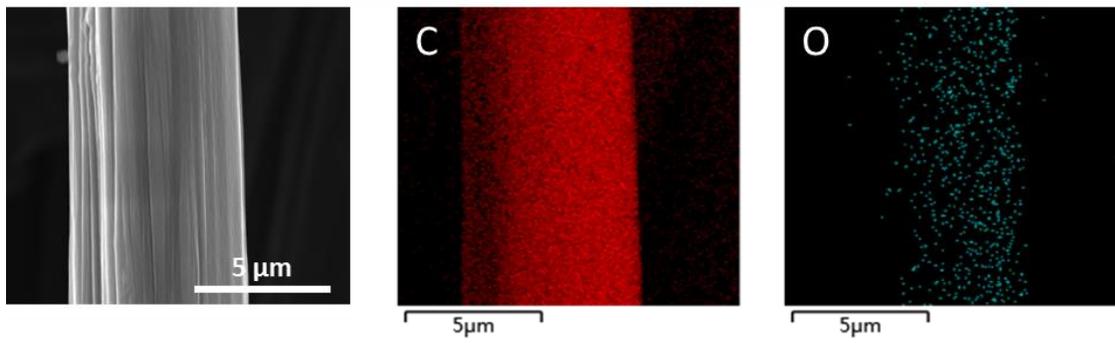


Figure S1. SEM and EDS images of CP.

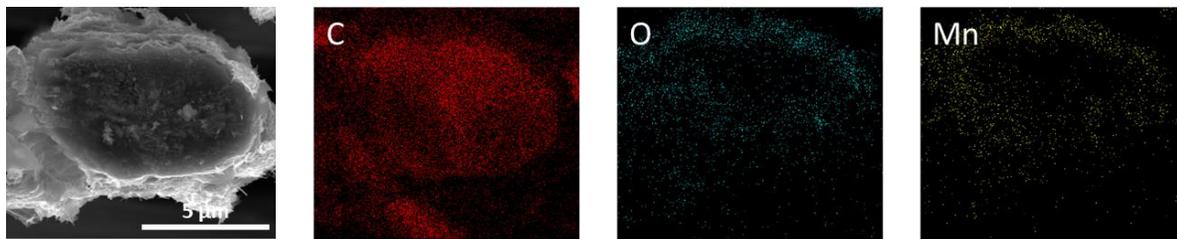


Figure S2. Cross-sectional SEM and EDS images of α -MnO₂@CP.

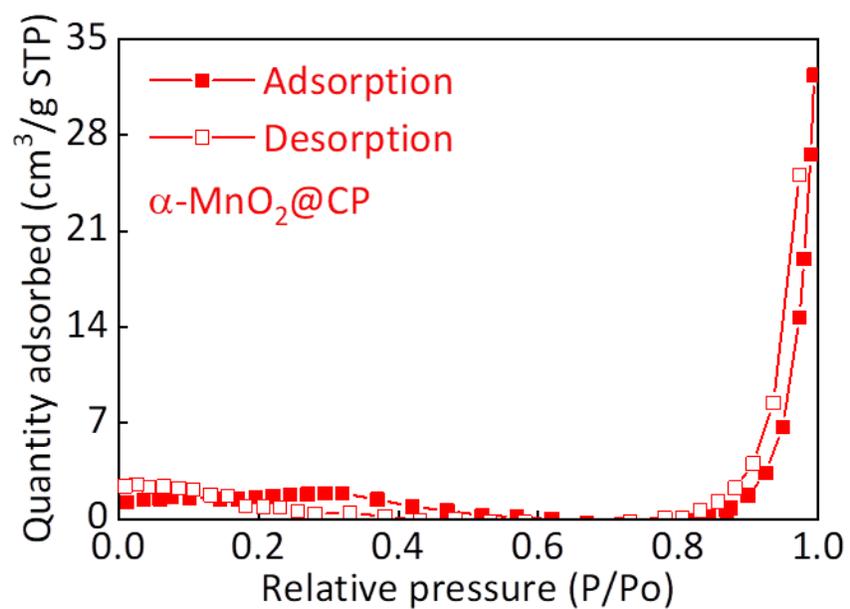


Figure S3. BET measurement of α -MnO₂@CP with adsorption-desorption curves.

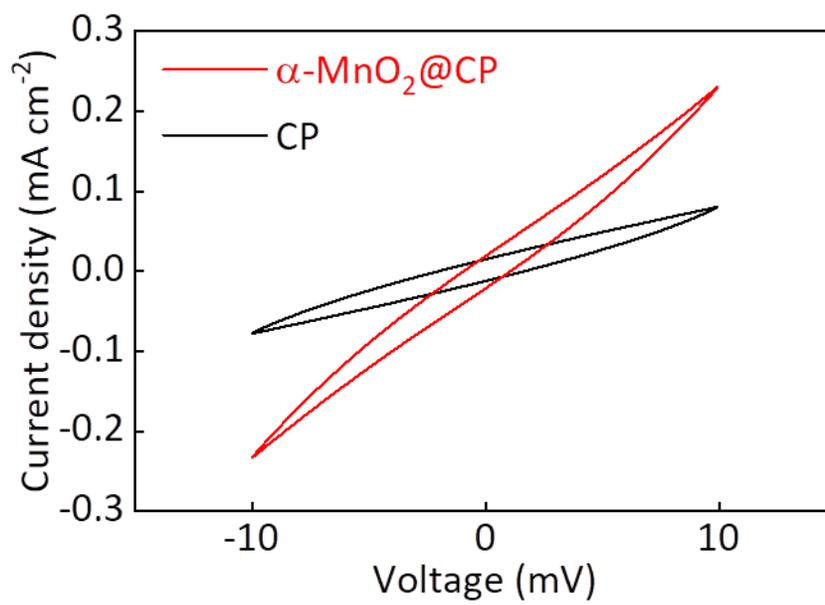


Figure S4. CV curve of all-solid-state Li || Li symmetrical cells using CP or α -MnO₂@CP interlayers at a scan rate of 0.5 mV s⁻¹.

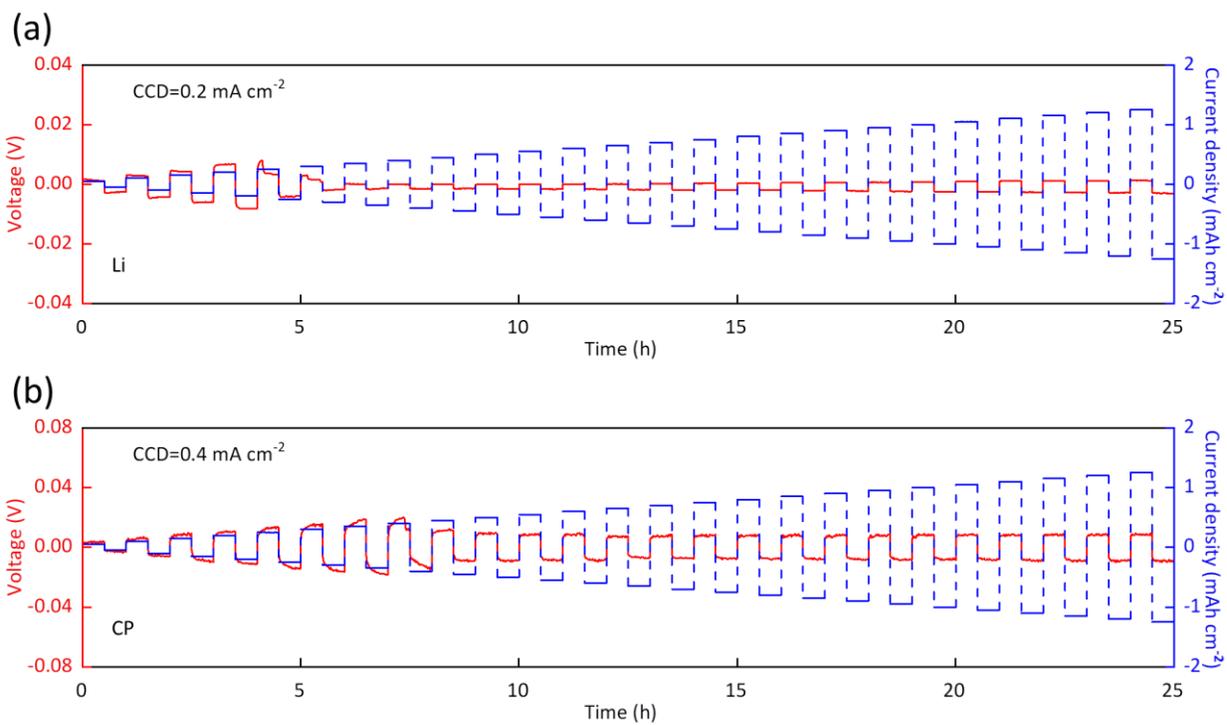


Figure S5. Voltage profile of CCD measurement for all-solid-state Li || Li symmetrical cells using (a) bare Li without interlayer and (b) CP interlayer between Li and SE.

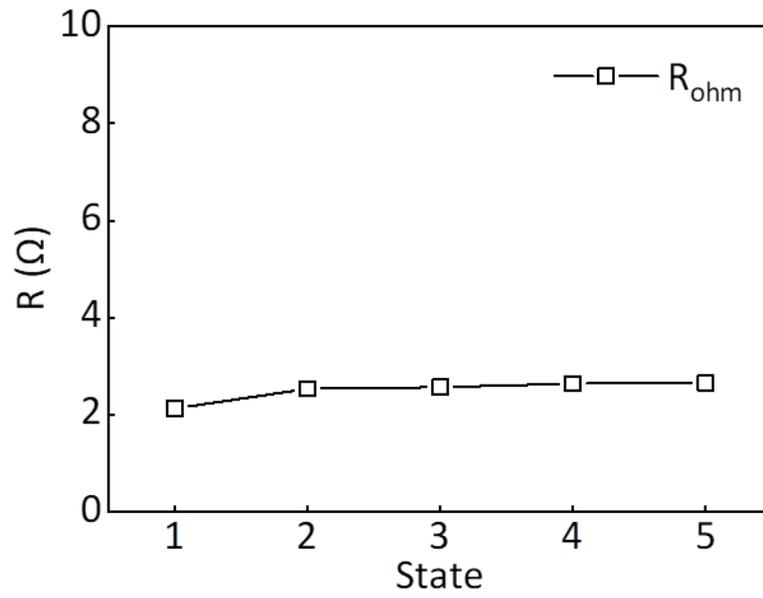


Figure S6. R_{ohm} evolution of α -MnO₂@CP at different states during lithiation/delithiation processes.

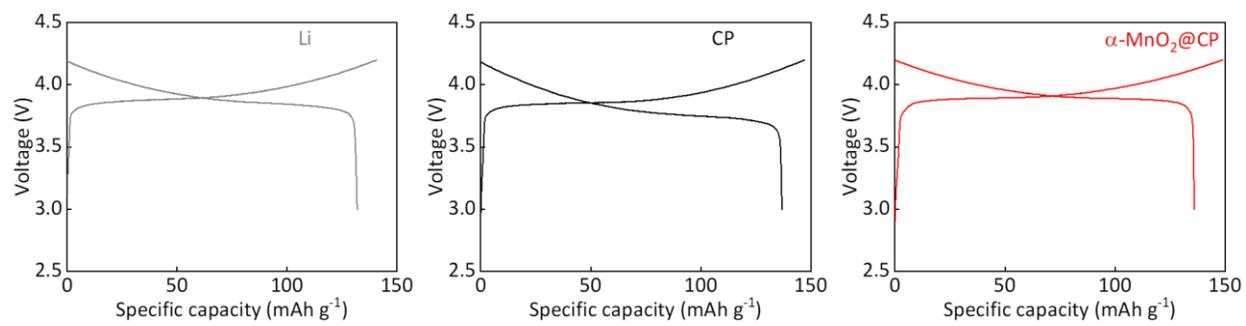


Figure S7. Pre-cycling charge/discharge curves of ASSLMBs at 0.1C/0.1C.

Table S1. Survey of CCD obtained in recent studies.

Method	Electrolyte	CCD (mA cm ⁻²)	Reference
Co/Li ₂ O interlayer	Li _{6.4} La ₃ Zr _{1.4} Ta _{0.6} O ₁₂	1.1	Science Bulletin 66 (2021) 1746–1753
Dual-layer multifunctional interface consisting of an upper layer enriched with organic LiBASF ₃ compounds and an LiF-rich lower layer	Li ₆ PS ₅ Cl	1.9	Nano Energy 120 (2024) 109150
Ag/LiF multi-layer	Ta-doped Li _{6.4} La ₃ Zr _{1.4} Ta _{0.6} O ₁₂	3.1	Science Advances 8 (2022) eabq0153
Li-SnF ₂ composite anode	Li _{5.5} PS _{4.5} Cl _{1.5}	3.5	Advanced Functional Materials 34 (2024) 2314306
α-MnO ₂ @CP interlayer	Li ₆ PS ₅ Cl	3.95	This work