Electronic Supplementary Material (ESI) for CrystEngComm.


# Chlorine-rich lithium argyrodite enables stable interfacial Li plating/stripping behavior in anode-free all-solid-state batteries

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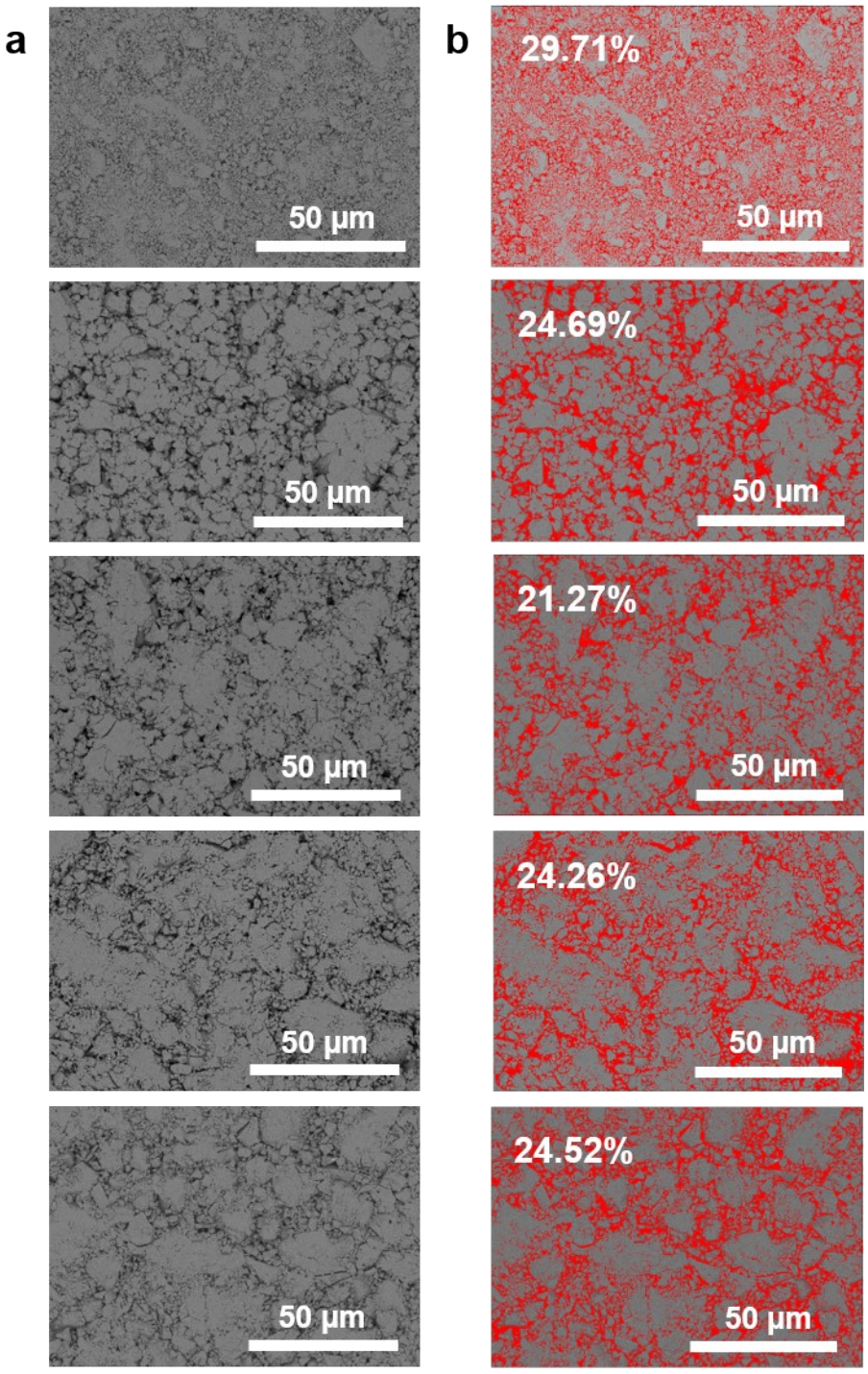


**Fig. S1.** Porosity analysis of SE pellets. (a) BSE images and (b) the corresponding porosity calculation of the surface for compressed SE pellets with $Li_3YCl_6$, $Li_3PS_4$, $(Li_3PS_4)_{0.7}(LiI)_{0.3}$, $Li_6PS_5Cl$, and $Li_{5.5}PS_{4.5}Cl_{1.5}$ in order from top to bottom.

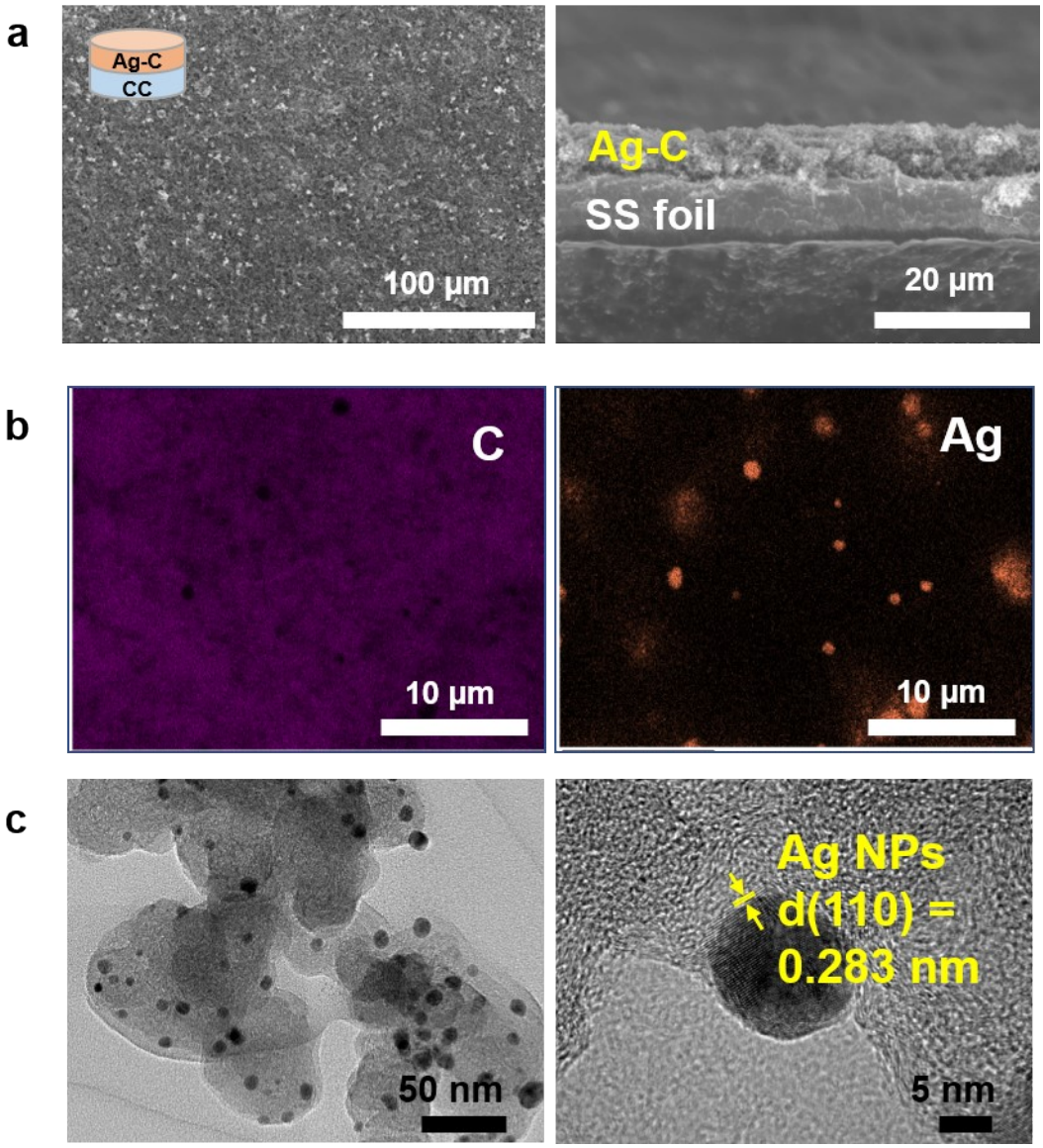


**Fig. S2.** Morphology and composition characterization of Ag-C layer. (a) Plane and cross-sectional view of SEM images, and (b) EDS mapping of Ag-C layer. (c) TEM image and HRTEM images of Ag-C composites.

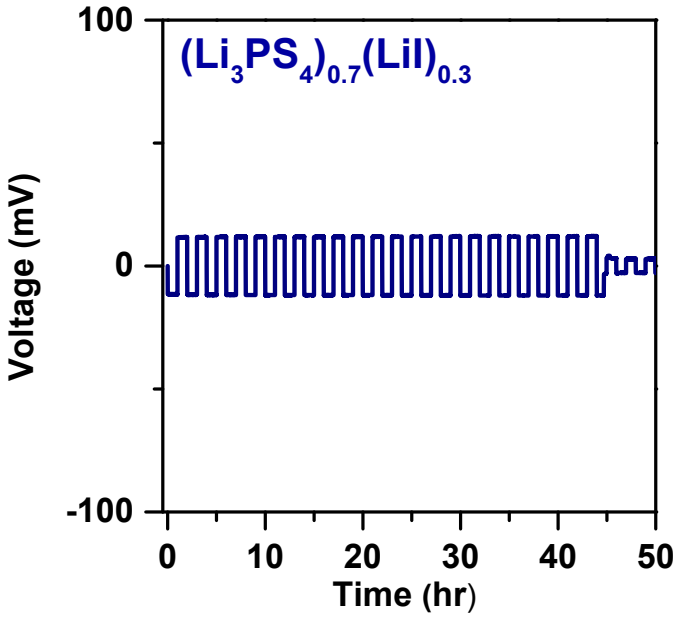


**Fig. S3.** Electrochemical performance of a symmetric cell (Li||$(Li_3PS_4)_{0.7}(LiI)_{0.3}$||Li). Voltage-time profiles of the Li plating/stripping process in Li symmetric cell with $(Li_3PS_4)_{0.7}(LiI)_{0.3}$ SE at the current density of 0.5 $mAcm^{-2}$.

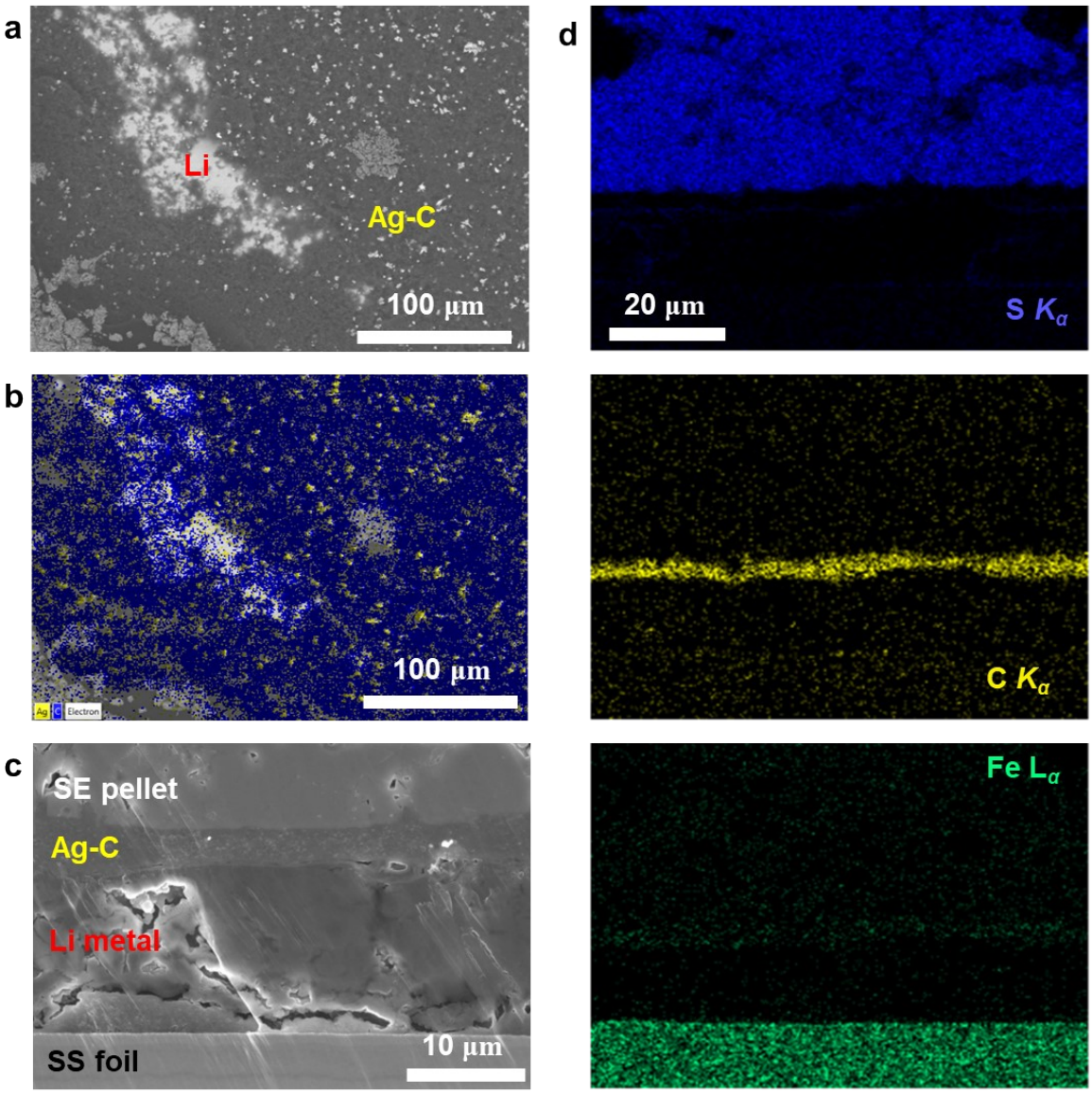


**Fig. S4** Planar (a) SEM and (b) EDS images of Li plating with Ag-C layer. Cross-sectional (c) SEM and (d) EDS images of SE/Ag-C/Li/SS interfaces in the NCM||Ag-C full cell using $Li_{5.5}PS_{4.5}Cl_{1.5}$ solid electrolyte after charging at 0.1 C for 10 h.