Supporting Information (SI)

Unravelling the electrochemical impedance spectroscopy of silicon half cells with commercial loading

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Electrolyte uptake and porosity measurements

Electrolyte uptake (%):	$\frac{W_{elec} - W_{dry}}{W_{dry}} \times 100$
Porosity (%):	$\frac{W_{PC} - W_{dry}}{\rho_{PC} V_{dry}} \times 100$

where W_{dry} is the mass of the dry electrode. W_{elec} and W_{PC} are the masses of the electrodes after soaking for 24 h in electrolyte and propylene carbonate (PC, Tinci), respectively. ρ_{PC} is the density of PC (1.205g/cm^3) and V_{dry} is the volume of the dry electrode.
The masses of the soaked electrodes were measured after removing from the solution and dabbing them with paper tissue to remove excess liquid. All experiments took place in an Argon-filled glovebox.

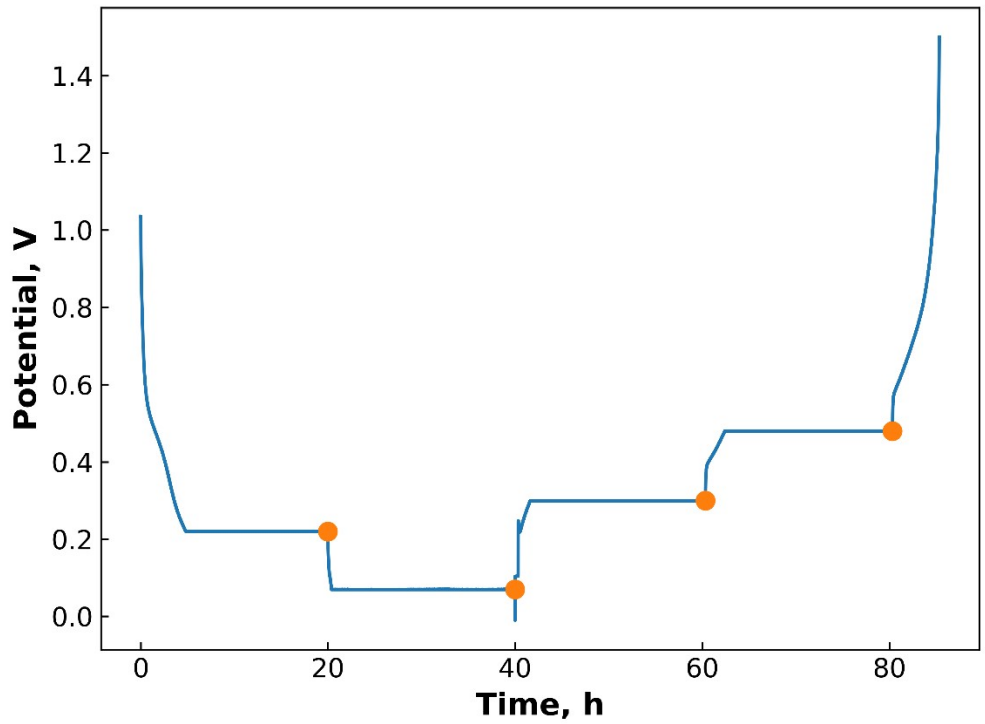

Figure S1. An example of the cycle used for preparing the electrode for EIS, showing how the CCCV procedure is set to each "stop" potential. EIS was taken at the end of each CCCV step, as shown by the orange circles.

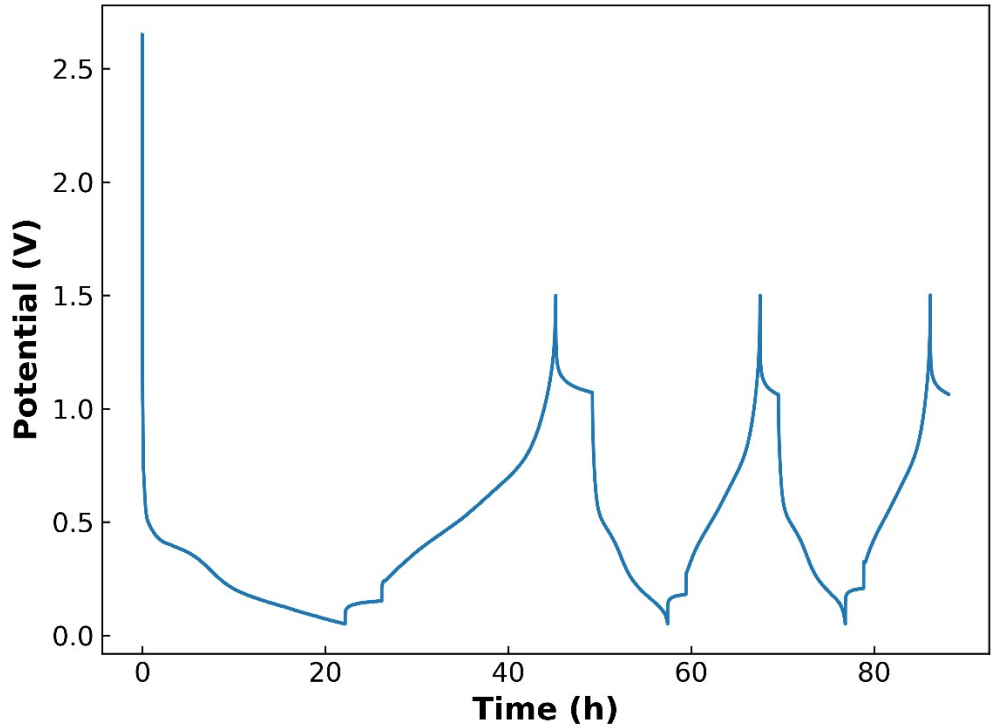

Figure S2. An example of the formation cycles performed on Si half-cells used in this study. The first cycle was performed at 1/20 C, while the second and third cycles were performed at 1/10 C

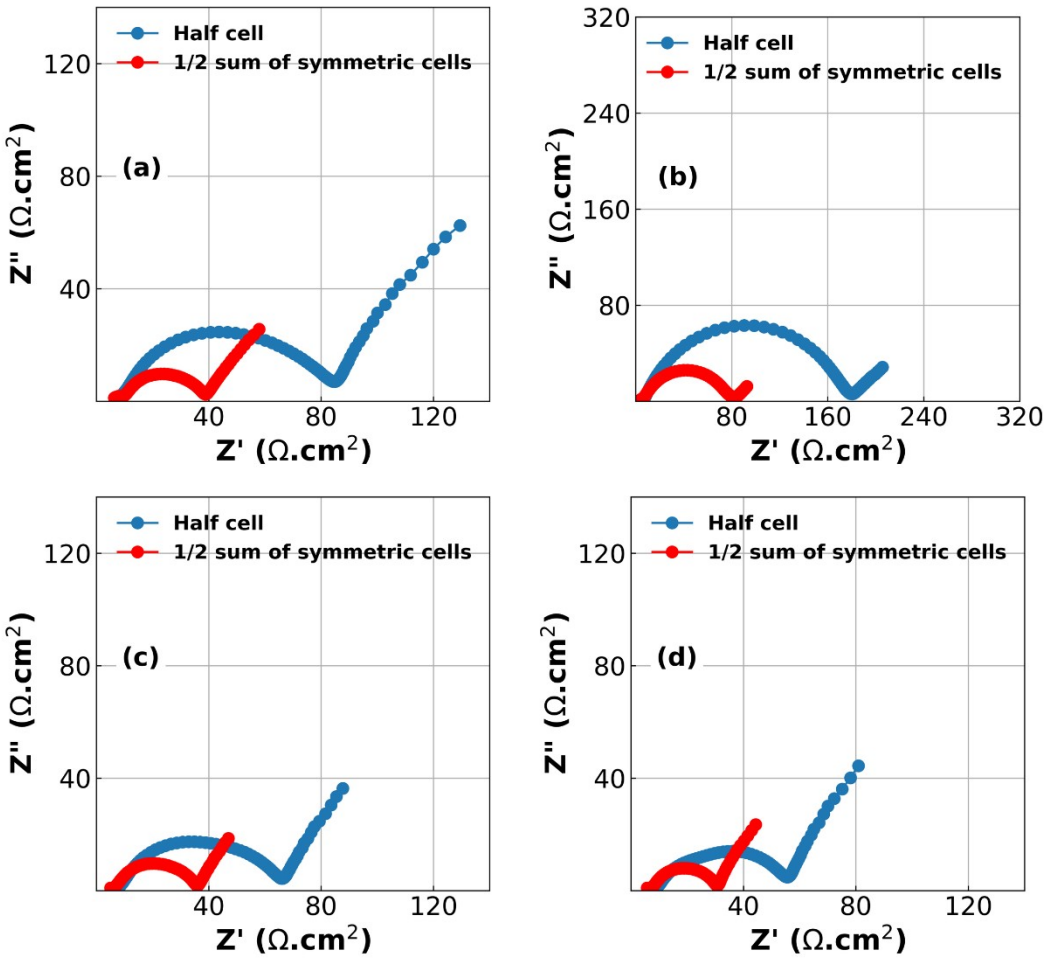

Figure S3. EIS spectra of half cell (blue points) and the half-sum of the equivalent symmetric cells (red points) (a) 0.2 V in the lithiation step; (b) 0.07 V in the lithiation step; (c) 0.3 V in the delithiation step; (d) 0.48 V in the delithiation step.