Solid-state batteries rabat

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Despite the variability in the processing conditions, the reported thicknesses of all cells are similar (Supplementary Tables 2-20), showing again that the processing protocol mostly plays a role in the resulting microstructure of each battery, which strongly affects its electrochemical performance16. Note that the specific compression profiles, including how fast the pressure is applied and released, and the way the pressure was controlled (if it was controlled at all; Supplementary Table 1), was not monitored in this study but is expected to have an effect on the microstructure.

These commonalities strongly indicate that the reproducible preparation of the positive electrode composite is decisive for good cell performance. It starts with the storage and handling of the materials and continues with the quality of the mixing procedure of the positive electrode materials and the SE, the homogeneous dispersion of the composite on top of the separator and the uniaxial compression profiles used.

Moving to the cycling pressures (Fig. 3d-f), even though poor capacity retentions are reported for cells that implement a cycling pressure below 40 MPa, they do not correlate with attainable initial discharge capacities. Rtot does also not correlate with the cycling pressure, but a trend can be seen in a plot with R0 as a function of the maximum applied pressure during assembly (Supplementary Fig. 9), where a decrease of the separator resistance R0 with increasing maximum pressure is observed, most clearly for the best performers.

Regarding the OCV (Fig. 3g-i), the outliers possess either very low capacities, unusual capacity retentions or both. Conversely, high specific capacities and capacity retentions and low total cell resistances are observed at OCV >= 2.5 V vs Li+/Li. This underlines the importance of the initial OCV measurement and that the OCV should be in the right range for a good cycling performance in cells using the electroactive materials evaluated in this study.

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