

The Importance of Sulfur Host Structural Preservation for Lithium–Sulfur Battery Performance

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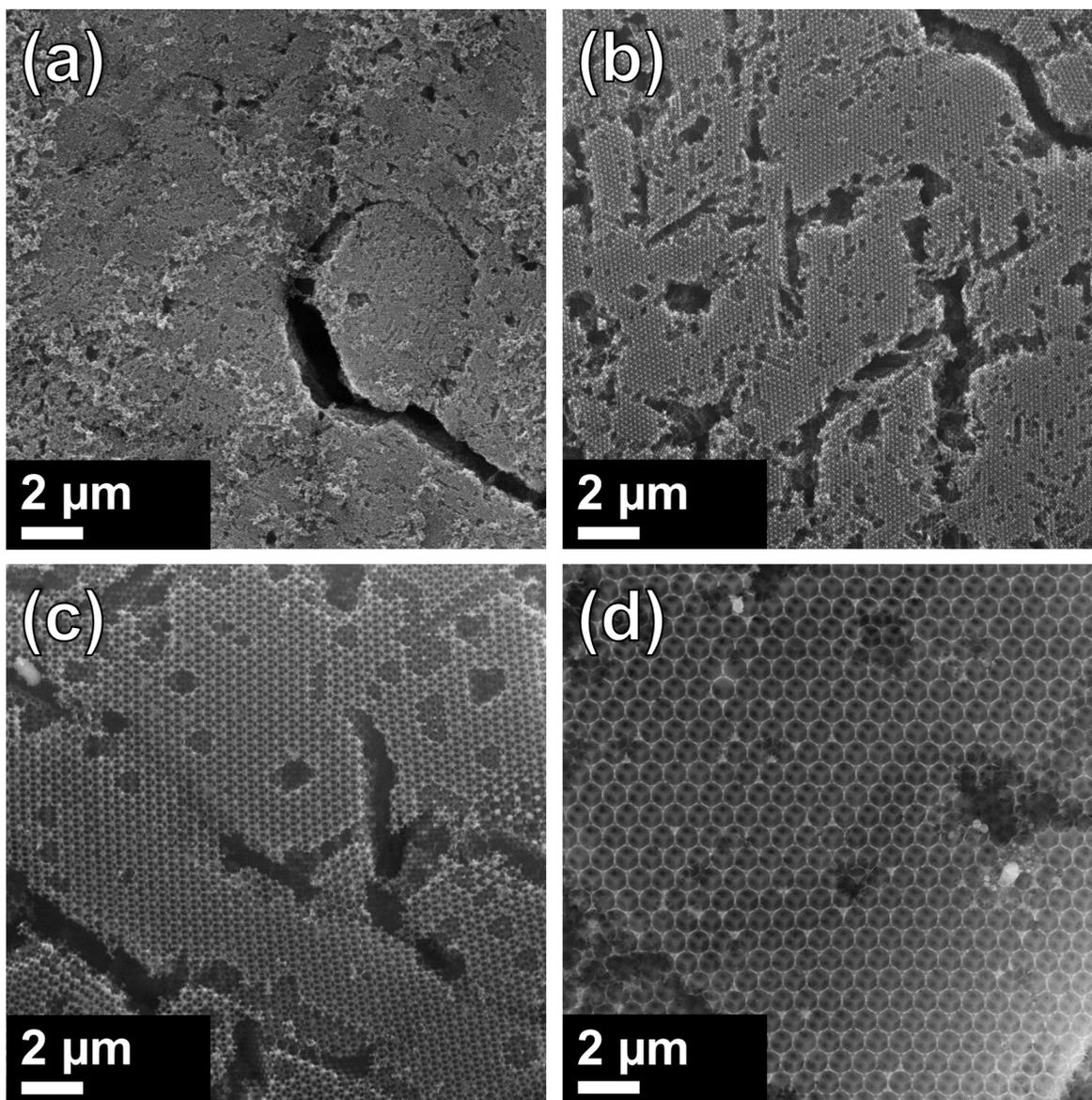


Fig. S1. Low magnification SEM images of (a) CIO-100, (b) CIO-200, (c) CIO-500 and (d) CIO-1000

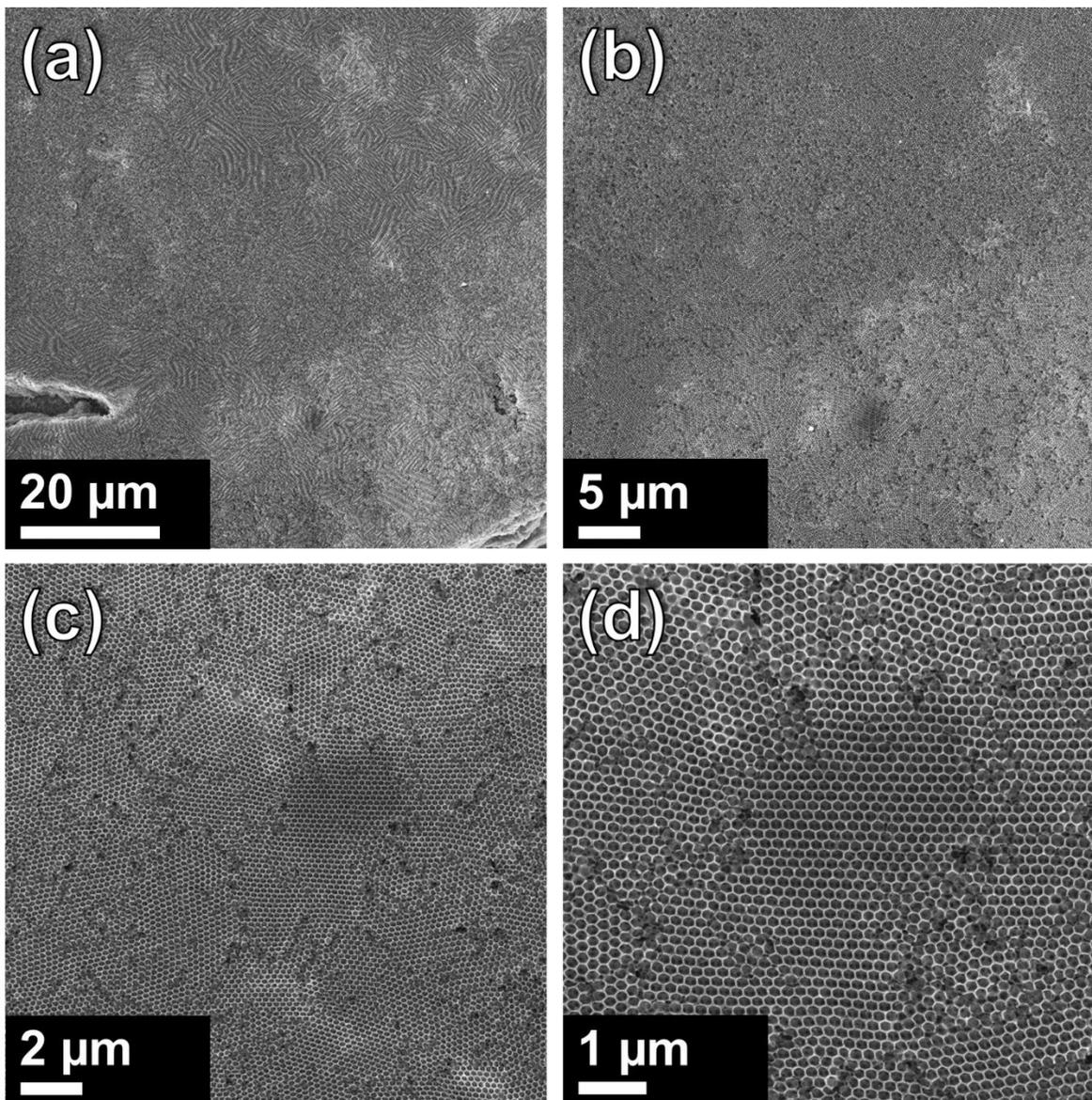


Fig. S2. Low magnification SEM images of an S-infilled CIO-200 sample

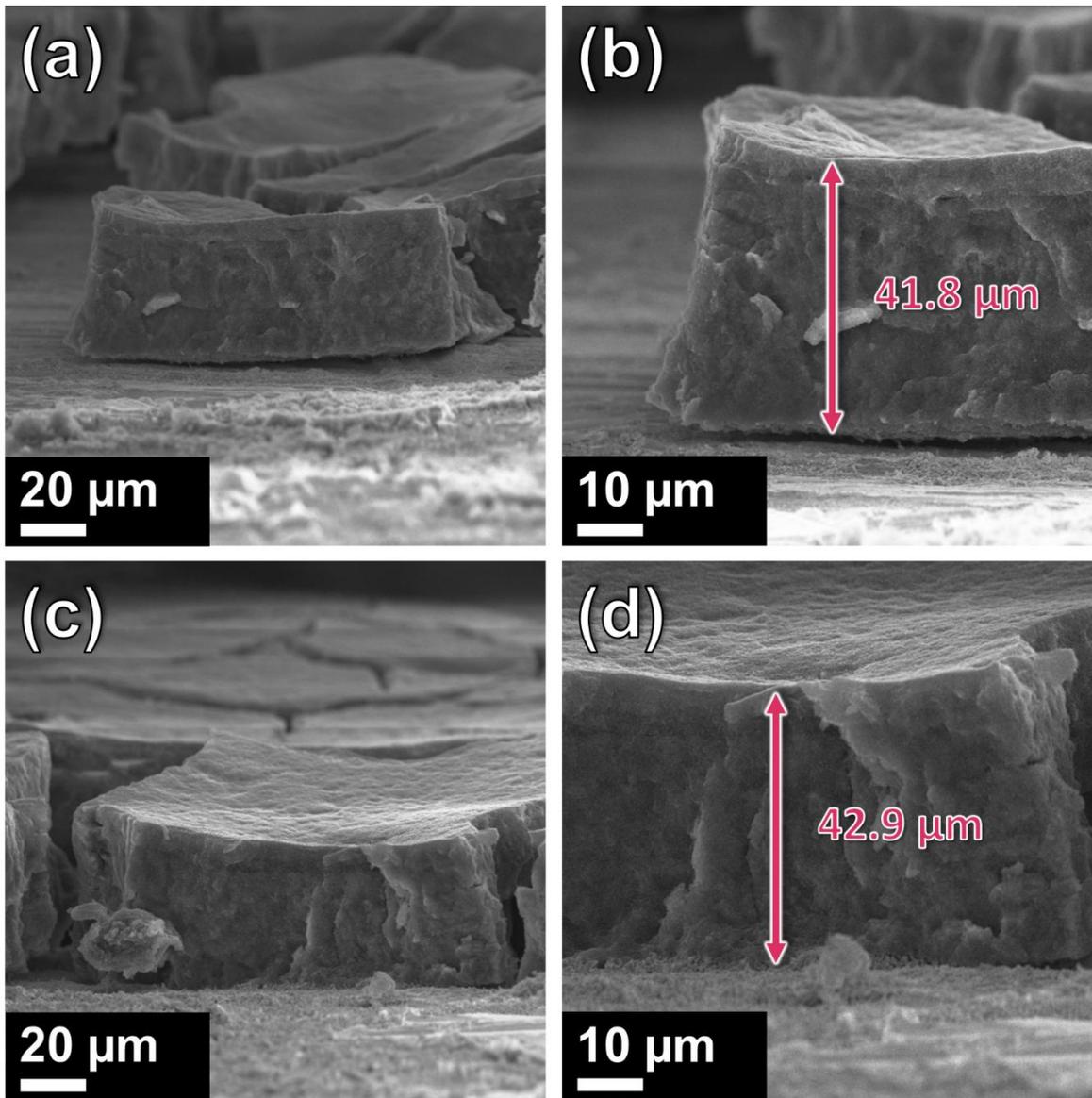


Fig. S3. Tilted SEM images of a fractured S-infilled CIO-200 sample, demonstrating the thickness of the IO material. (Tilt angle: 90°)

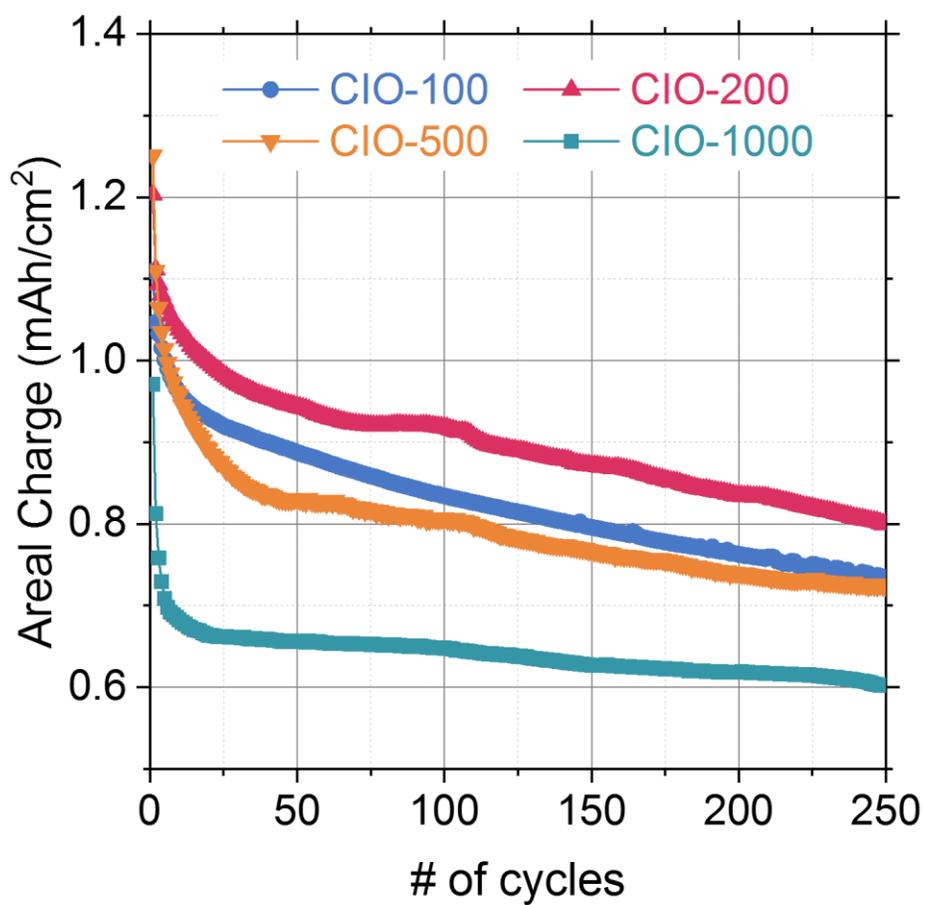


Fig. S4. Areal charge values for sulfur infilled CIO-100, CIO-200, CIO-500 and CIO-1000 over 250 cycles. All samples were cycled in a potential window of 2.7 – 1.8 V (vs Li/Li⁺) at 0.2 C.

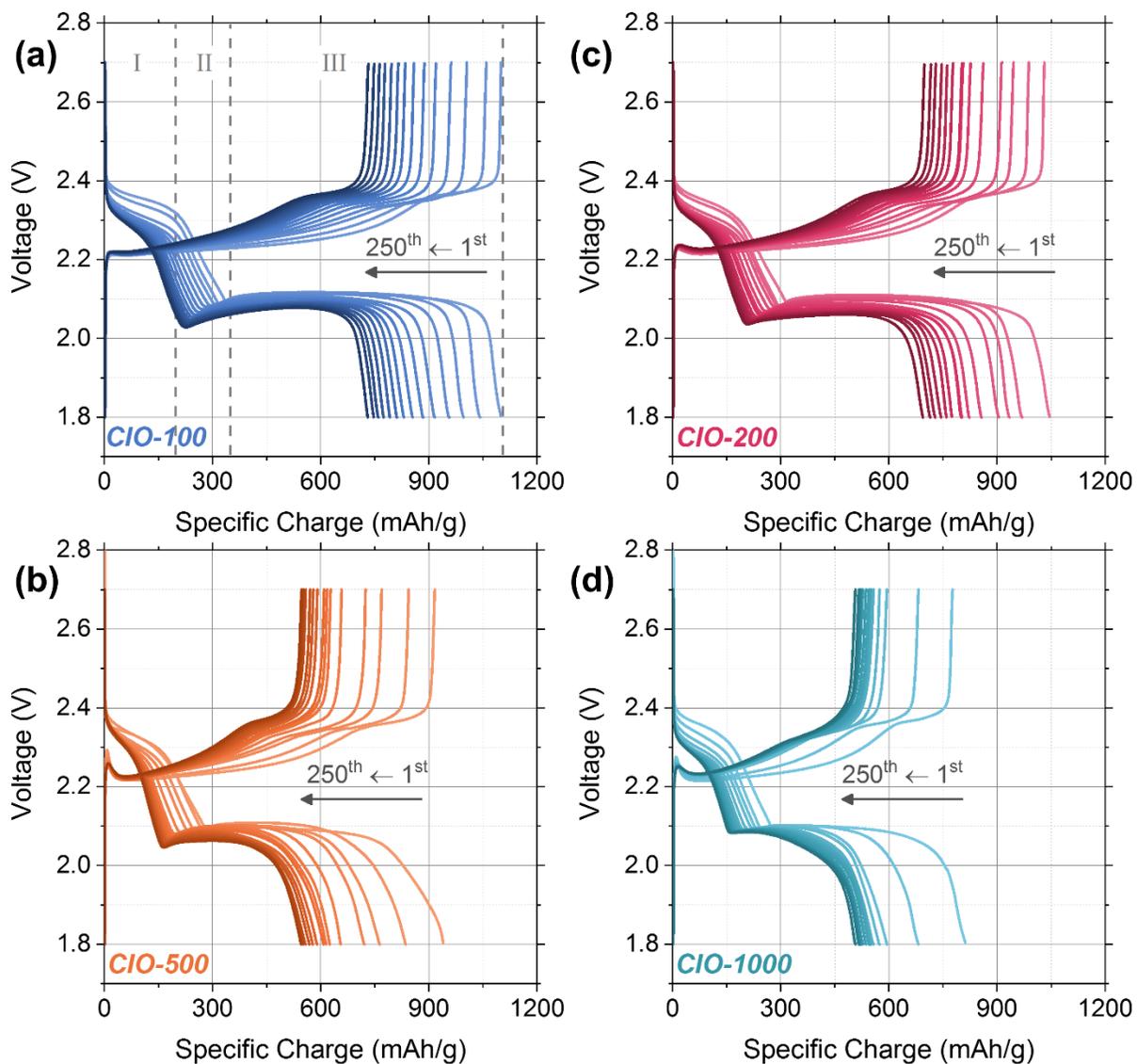


Fig. S5. A range of galvanostatic discharge and charge curves for (a) CIO-100, (b) CIO-200, (c) CIO-500 and (d) CIO-1000. All samples were cycled at a rate of 0.2 C. The cycles shown are for the 1st, 2nd, 5th, 10th and 25th cycles and then every 25th cycle from the 25th to the 250th cycle.

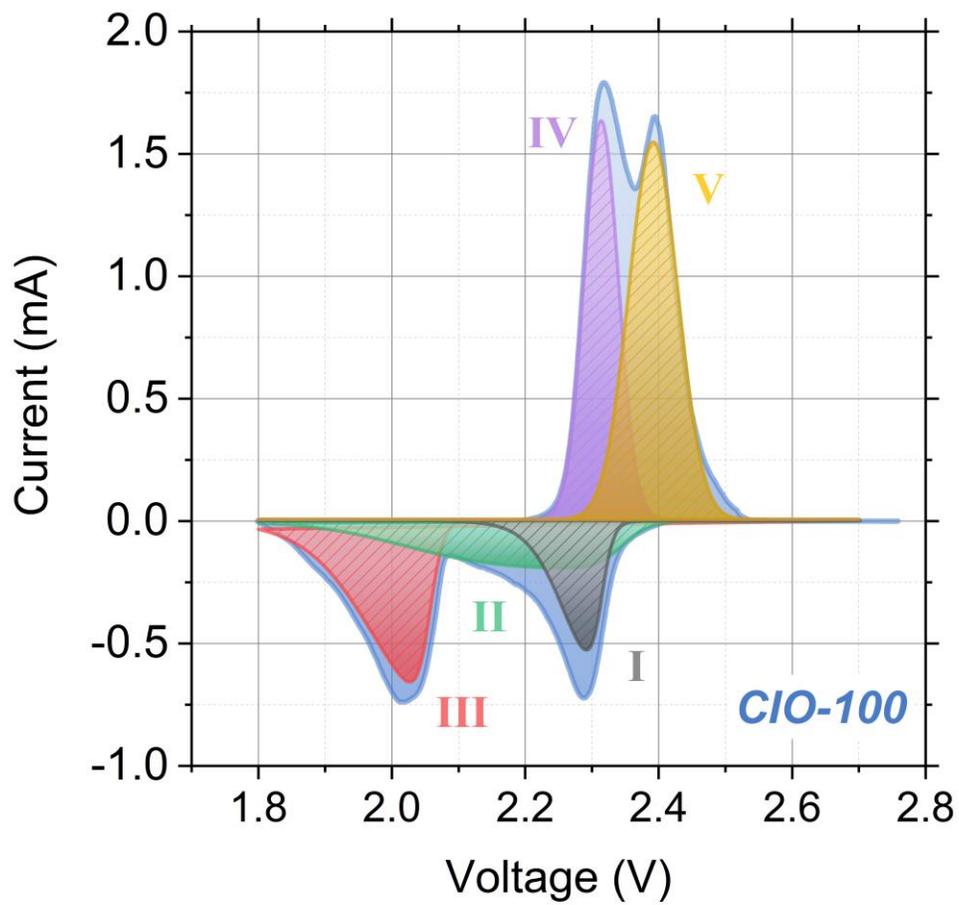


Fig. S6: Deconvoluted cyclic voltammogram for an S-infilled CIO-100 sample

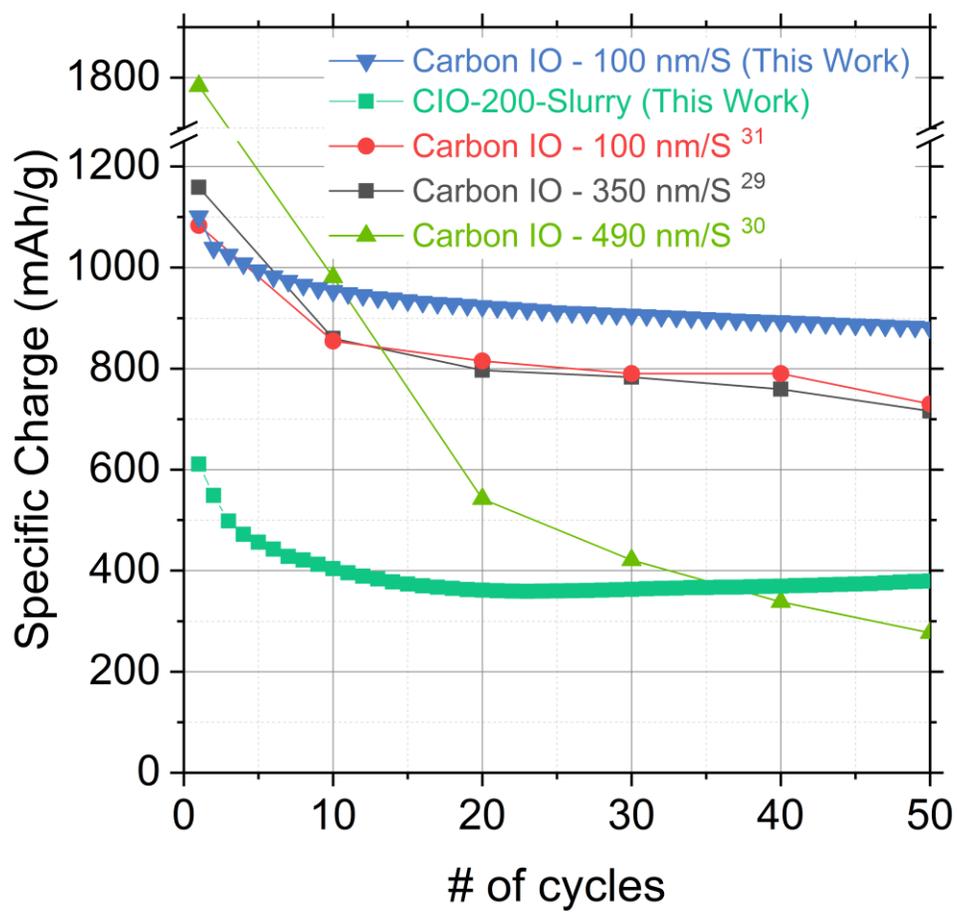


Fig. S7. Comparison of specific charge values obtained for an S-infilled carbon IO and a carbon IO slurry in this study with previously reported values for other carbon IO S-hosts. ¹⁻³

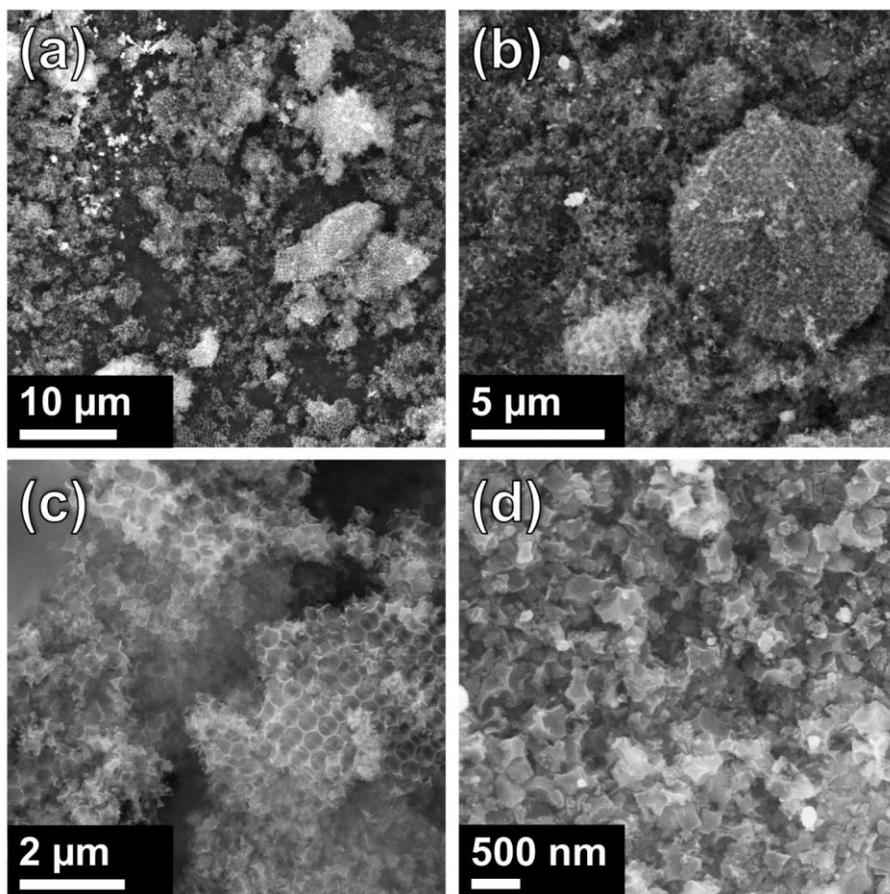


Fig. S8. SEM images of a carbon IO prepared with 500 nm diameter PSS after being removed from a stainless steel substrate and being ground in a mortar and pestle.

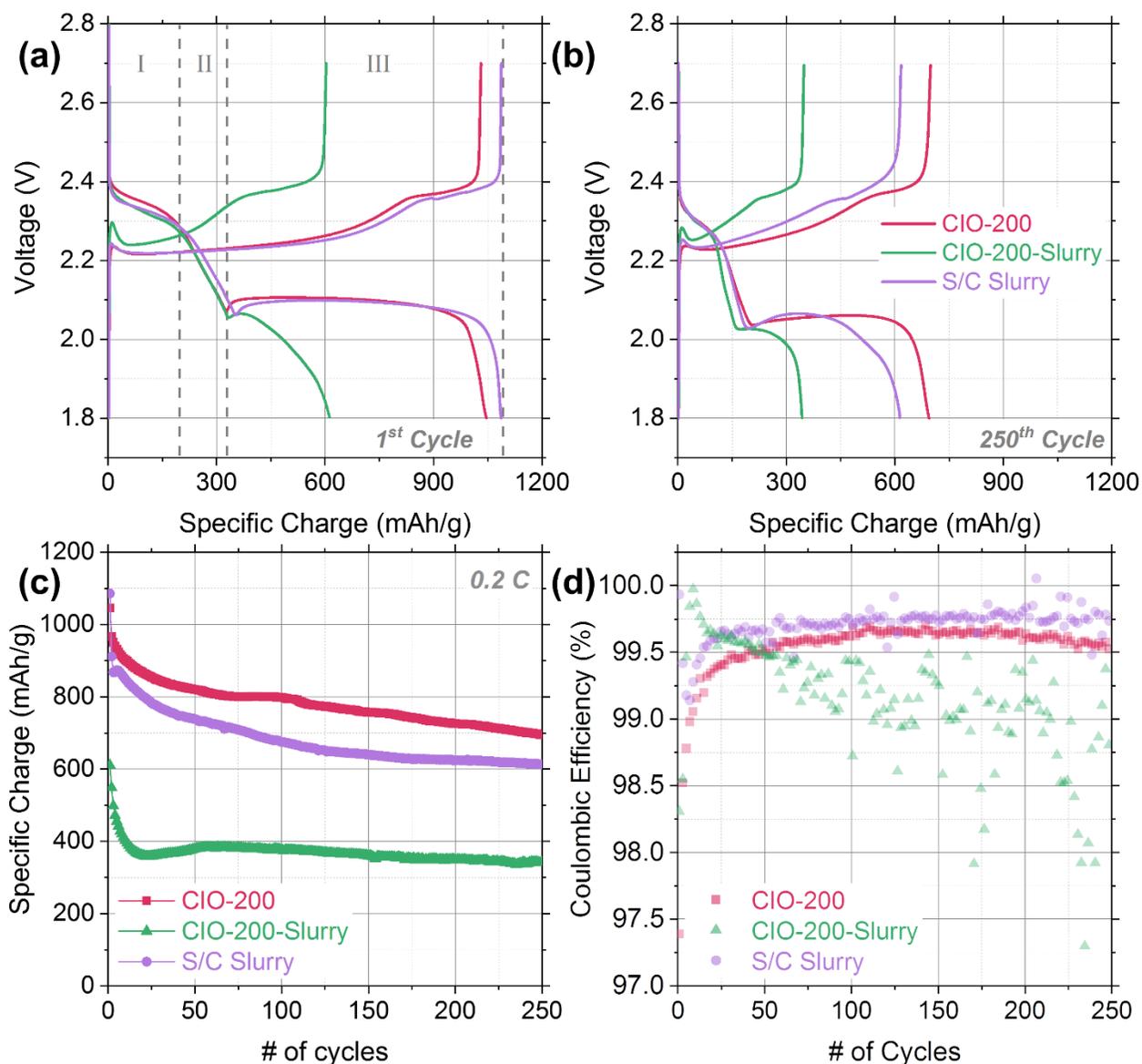


Fig. S9. A comparison of voltage profiles obtained for (a) the 1st and (b) the 250th cycles for a CIO-200-Slurry electrode, a binder/conductive additive free CIO-200 sample and a conventional C/S slurry. Comparison of (c) the specific capacity retention and (d) the Coulombic efficiency over 250 cycles. All samples were cycled in a potential window of 2.7 – 1.8 V (vs Li⁺/Li) at 0.2 C.

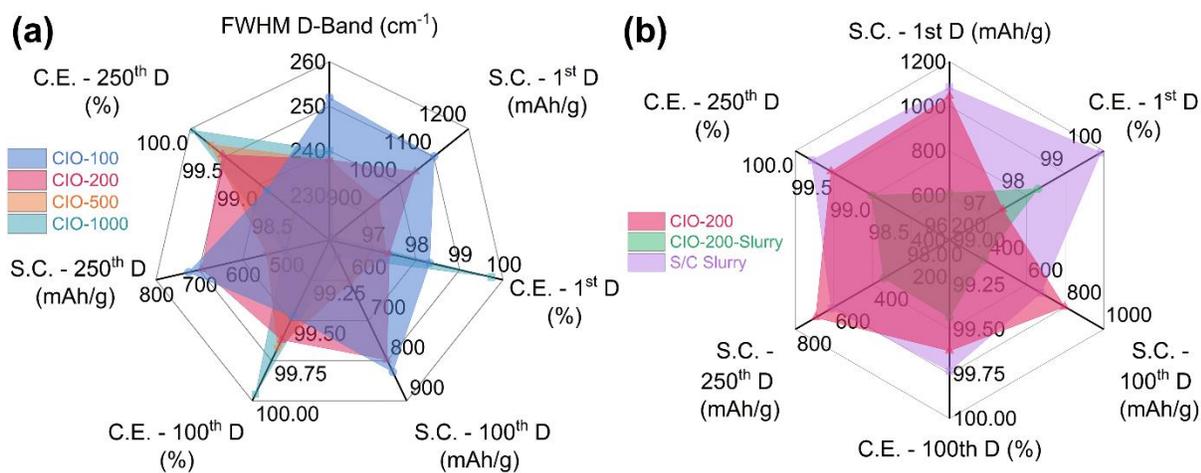


Fig. S10. (a) Radar plot comparing the FWHM of the D-band, from analysis of Raman spectroscopy, specific charge and Coulombic efficiency values for sulfur infilled CIO-100, CIO-200, CIO-500 and CIO-1000. (b) Radar plot comparing the electrochemical performance of CIO-200, CIO-200-Slurry and a conventional S/C composite slurry. Legend: S.C. = specific capacity, C. E. = Coulombic efficiency, D = Discharge.

References

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