

Supplementary Information for

Biomass-Derived Hard Carbon Host with Added Commercial Silicon for High-Capacity Lithium-ion Battery Anodes

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Keywords: anode materials, lithium-ion batteries, silicon, barley husks, sustainability

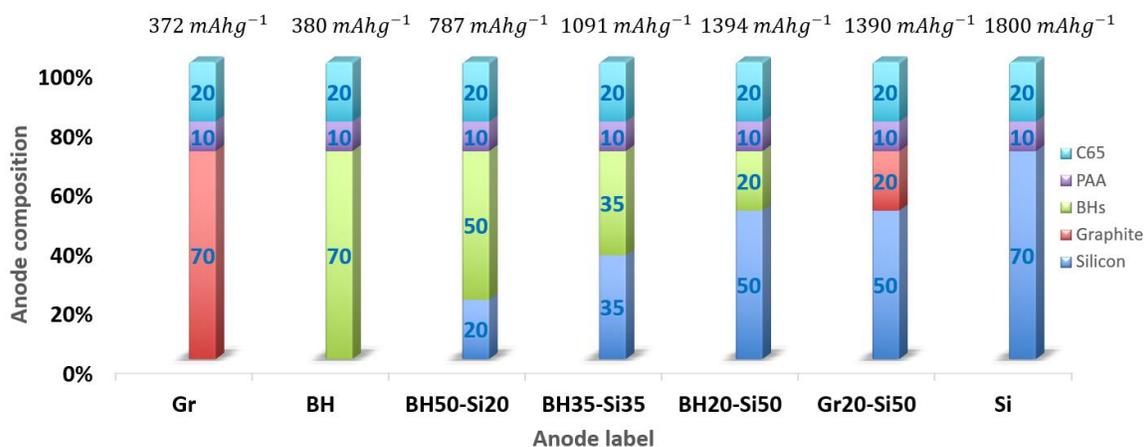


Figure S1. Composition of the investigated anodes (wt%) and the corresponding reference specific capacities used to define the C-rate for each formulation. All current densities reported in the manuscript were calculated from these 1C values.

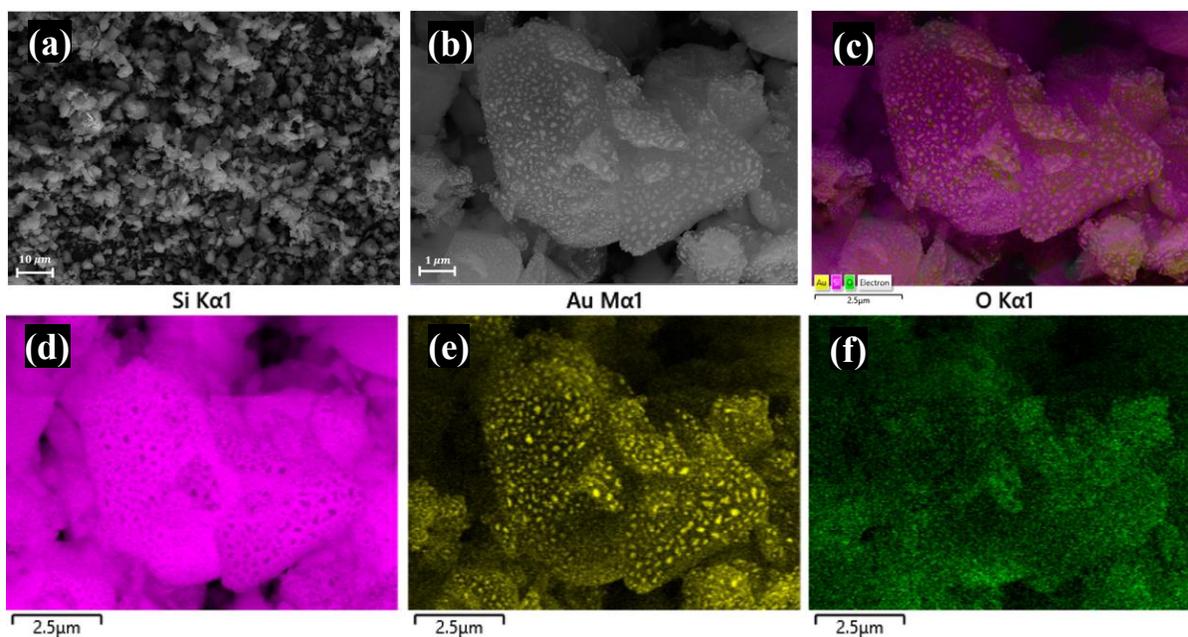


Figure S2. SEM and EDS characterisation of the commercial Si powder used as additive in the anodes. a) Low-magnification SEM image of Si powder, and b) to f) high-magnification SEM image and corresponding elemental maps for Si $K\alpha_1$, Au $M\alpha_1$ (sputter coating) and O $K\alpha_1$.

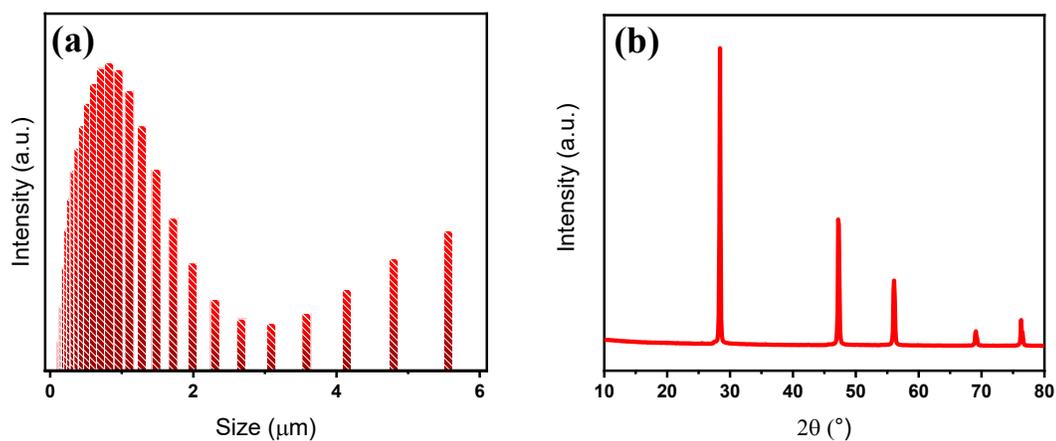


Figure S3. Structural and size characterisation of the commercial Si powder: a) particle-size distribution obtained by DLS, indicating a dominant population of sub-micrometre to few-micrometre Si agglomerates; b) XRD pattern indexed to crystalline Si, showing sharp reflections characteristic of diamond-cubic Si with no additional crystalline oxide phases.

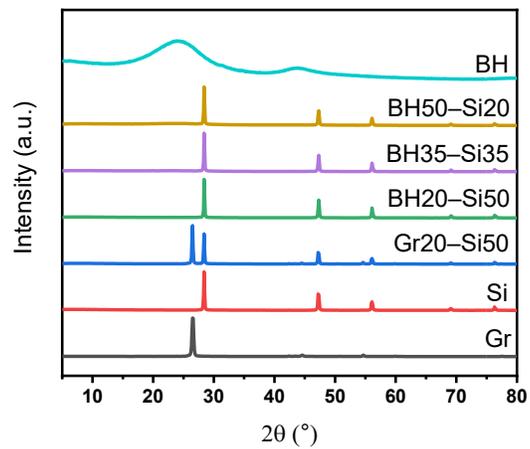


Figure S4. X-ray diffraction patterns of graphite (Gr), commercial silicon (Si), Gr20-Si50, BH-derived carbon (BH), and BH-Si hybrid anodes (BH50-Si20, BH35-Si35, BH20-Si50), showing crystalline Si reflections superimposed on the disordered carbon background.