# Electronic Supporting Information (ESI) *for*

## Salt-mediated extraction of nanoscale Si building blocks: Composite anode for Li-ion full battery with high energy density

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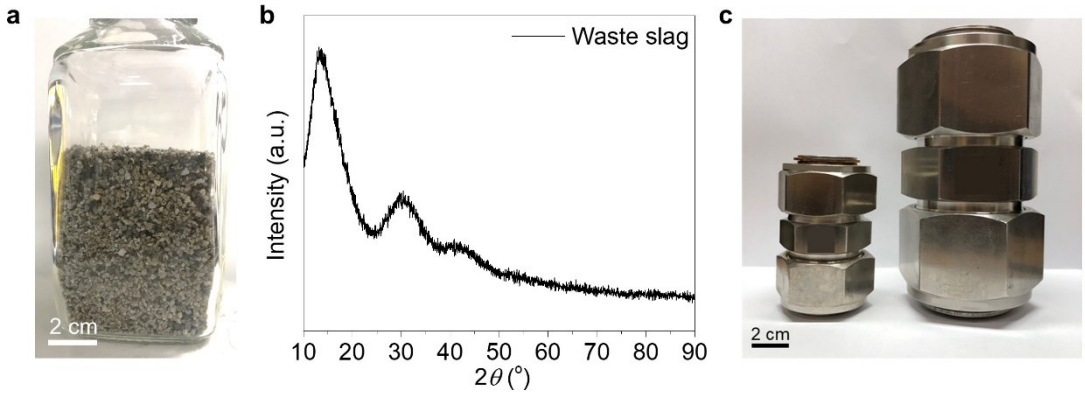


**Figure S1.** Analysis of slag waste. (a) Photograph, (b) XRD pattern of slag waste, and (c) Photograph of home-made stainless steel reactors with different sizes.

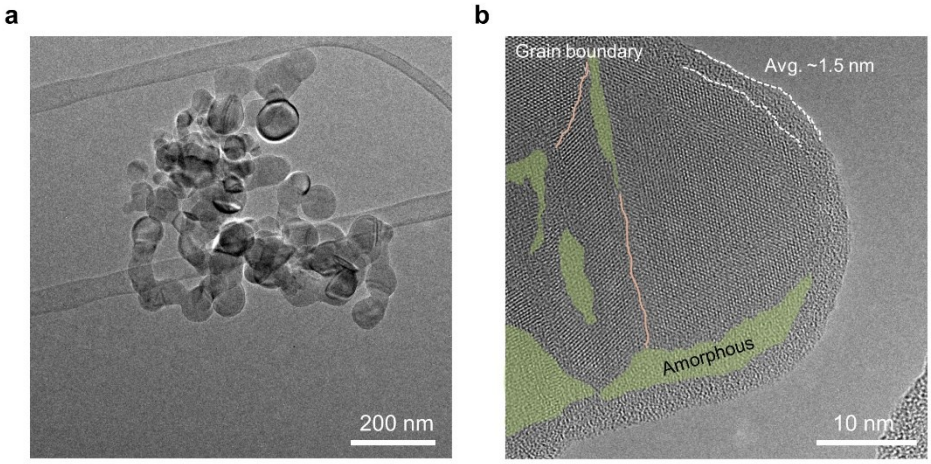


**Figure S2.** Characterization of commercial SiNP. (a) Low and (b) High-magnification TEM images of commercial SiNP (CS), showing a thick passivation layer and poor crystallinity.

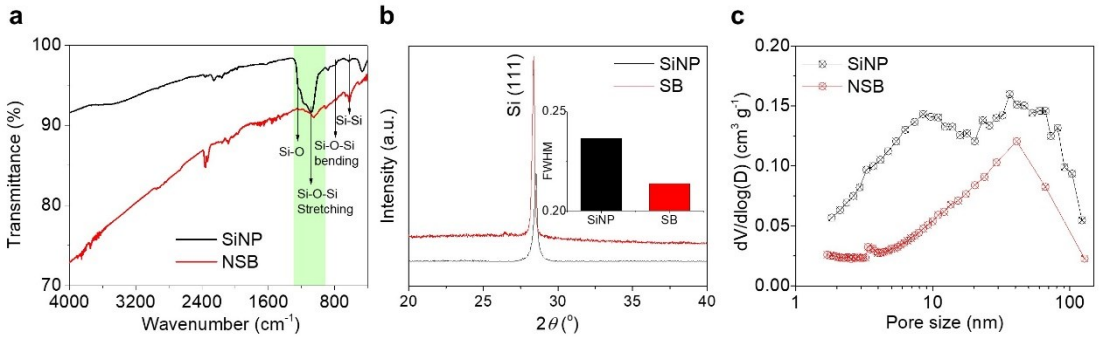


**Figure S3. Physical properties of SiNP and NSB samples.** (a) FTIR spectra of SiNP and NSB samples. (b) Crystallinity comparison. XRD patterns of SiNP and NSB in the two-theta range of 20-40°, showing the different position of mother peak and FWHM values (inset: FWHM values for two samples). (c) BJH pore size distribution curve for SiNP and NSB samples..

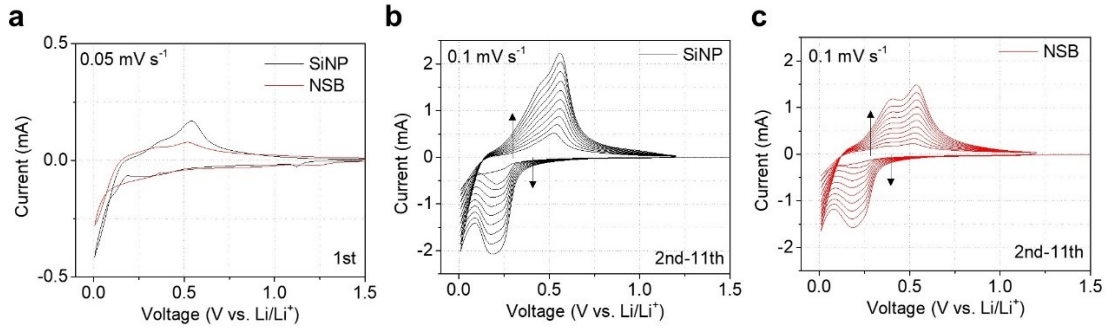


**Figure S4.** CV curves of SiNP and NSB electrodes (a) at 0.05 mV $s^{-1}$ and subsequent CV curves of (b) SiNP and (c) NSB electrodes at 0.1 mV $s^{-1}$.

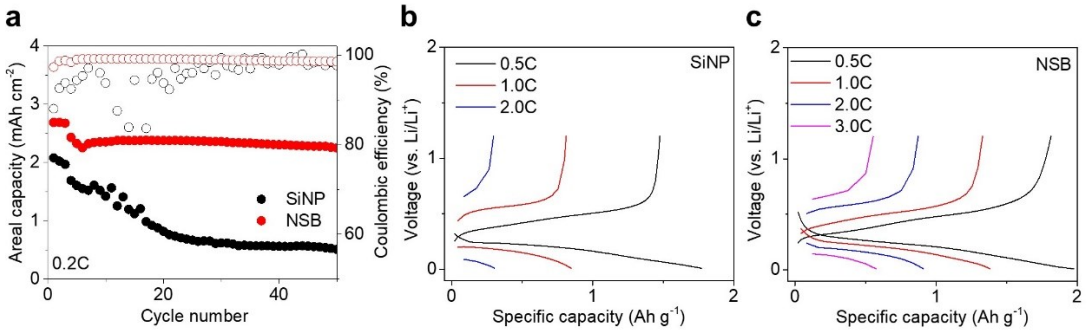


**Figure S5.** (a) Capacity retention results at 0.2 C and voltage profiles of (b) SiNP and (c) NSB electrodes at various C-rates.

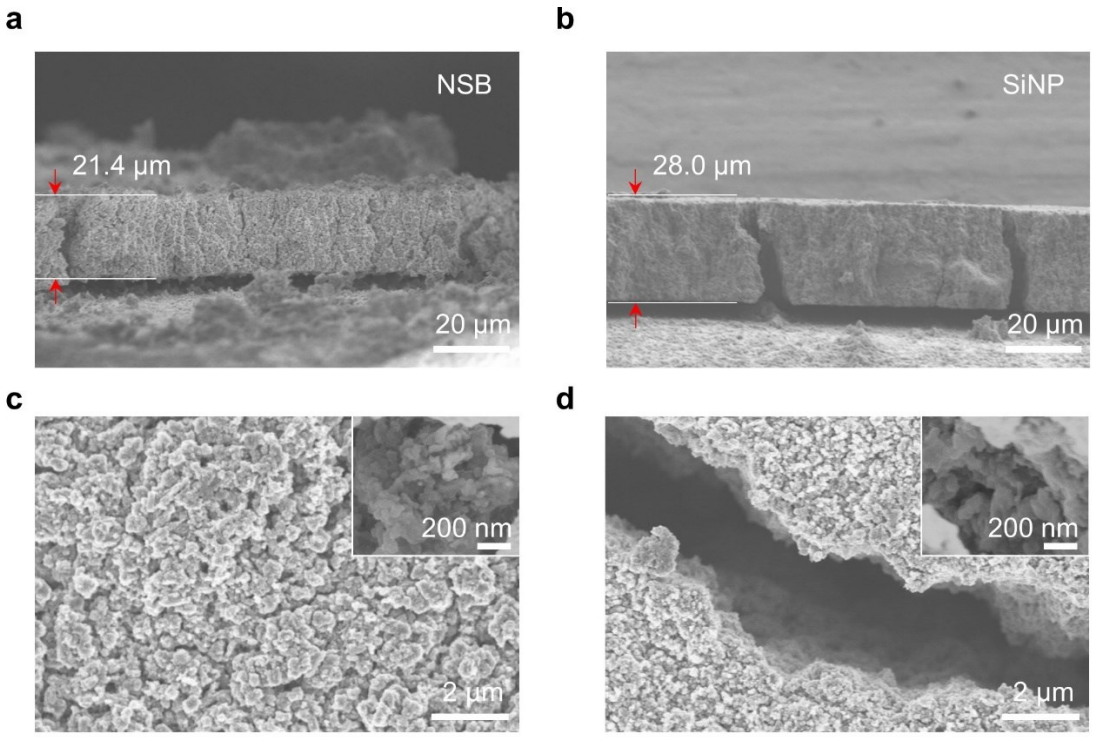


**Figure S6. Electrode stability of SiNP and NSB electrodes.** Cross-sectional (a, b) and top-view (c, d) SEM images of SiNP and NSB electrodes, respectively.

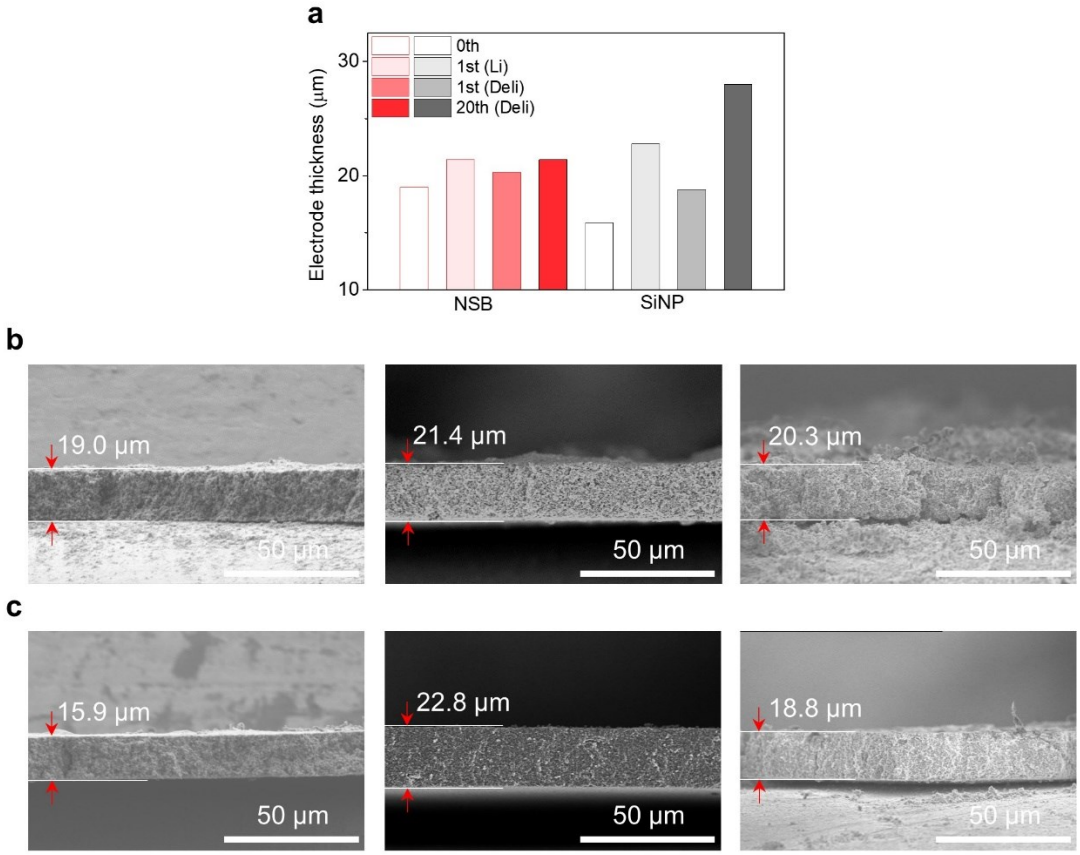


**Figure S7.** (a) Summary chart for thickness of NSB and SiNP electrodes at different stages of cycles. Cross-sectional SEM images of (b) NSB and (c) SiNP electrodes before the cycle, after full lithiation, and after 20 cycles, respectively.

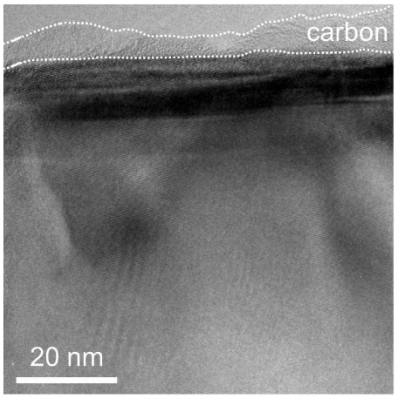


**Figure S8.** TEM image of C-NSB sample.