

## Supplementary Information

### **A 3D structure C/Si/ZnCo<sub>2</sub>O<sub>4</sub>/CC anode for flexible lithium-ion batteries with high capacity and fast charging ability**

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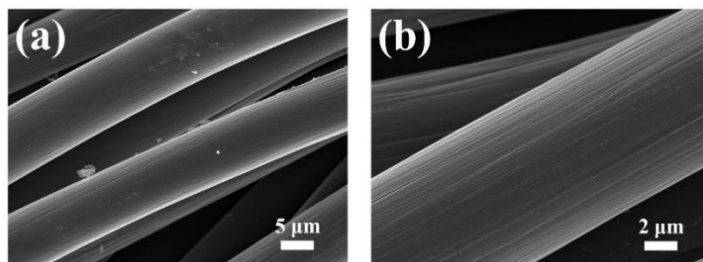


Figure S1. FESEM images of CC current collector.

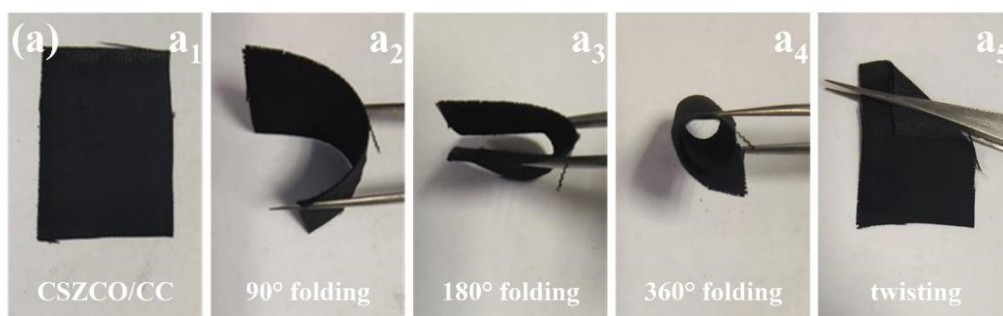
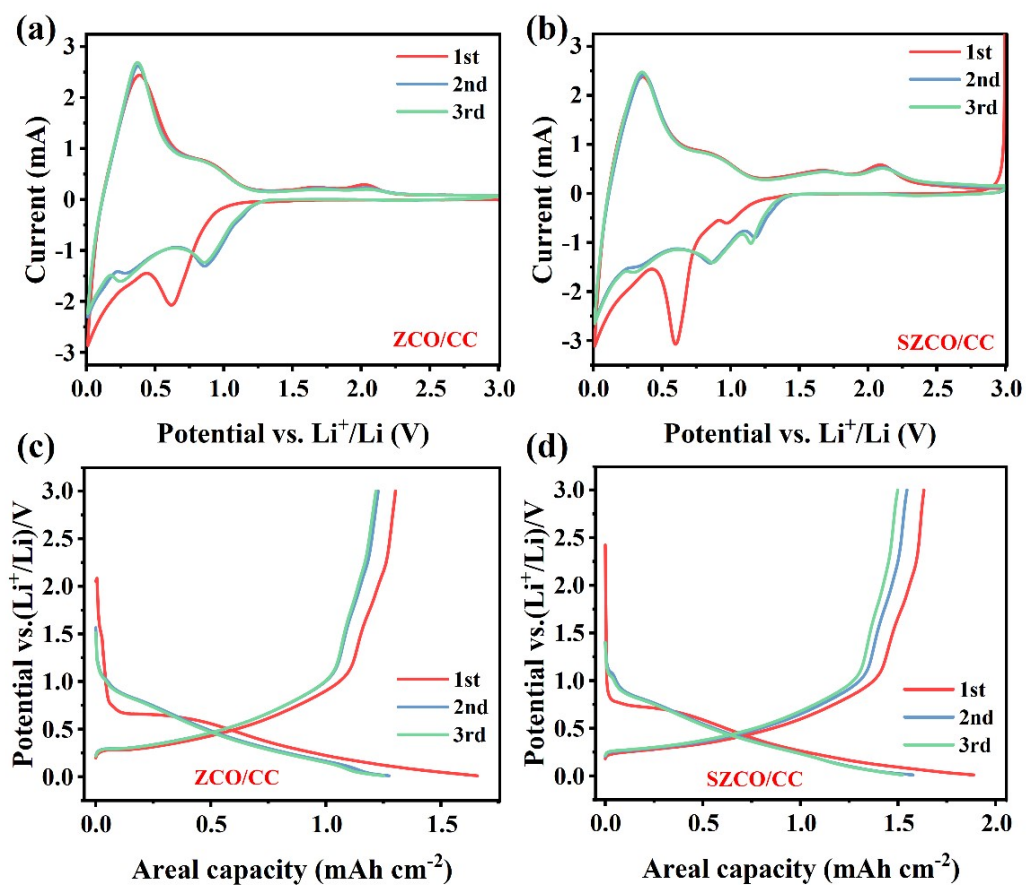
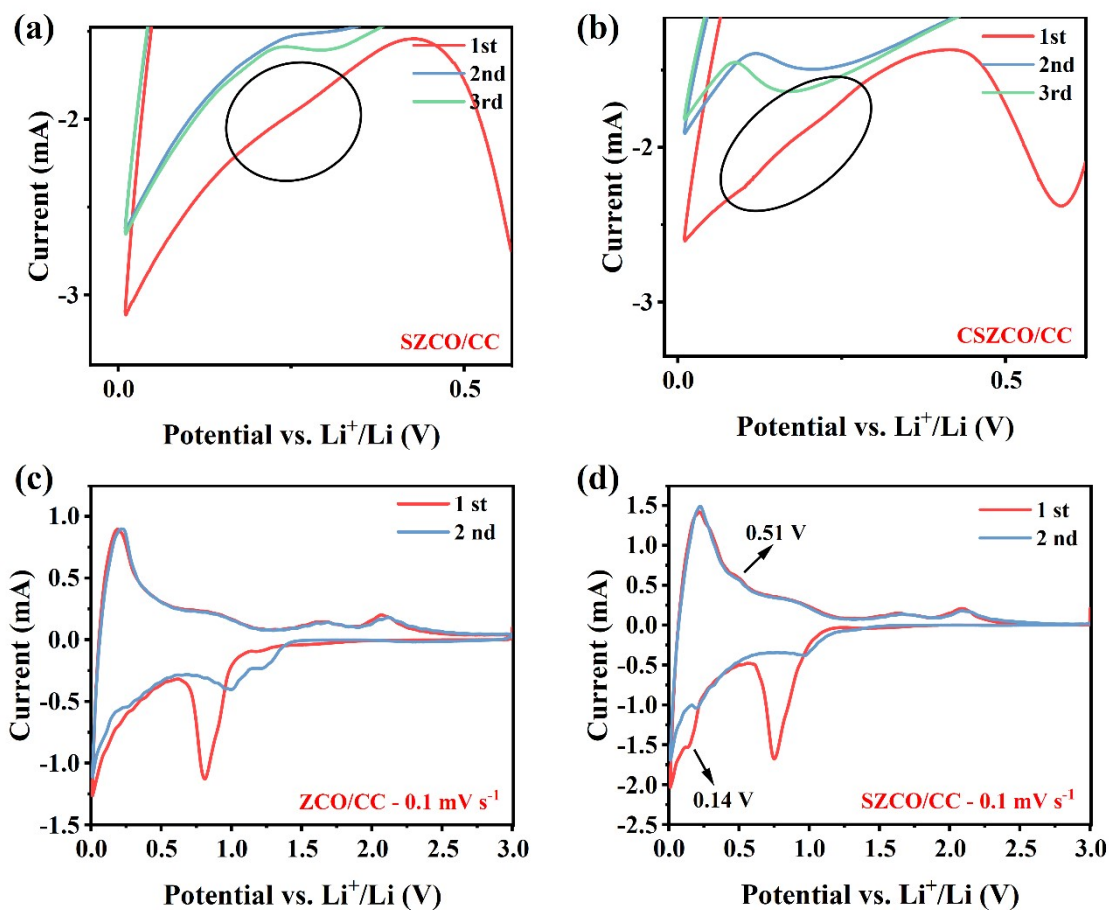


Fig. S2. (a) Digital images of CSZCO/CC at 90° folding, 180° folding, 360° folding, and twisting.

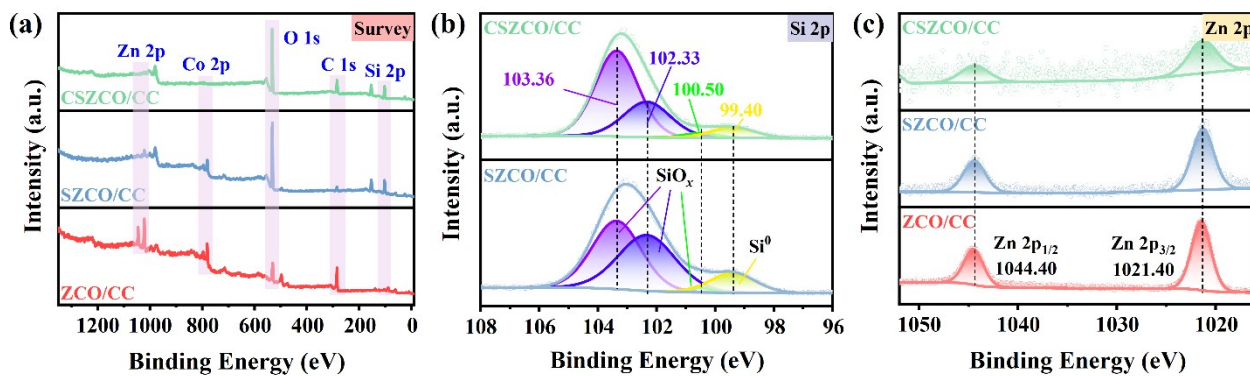


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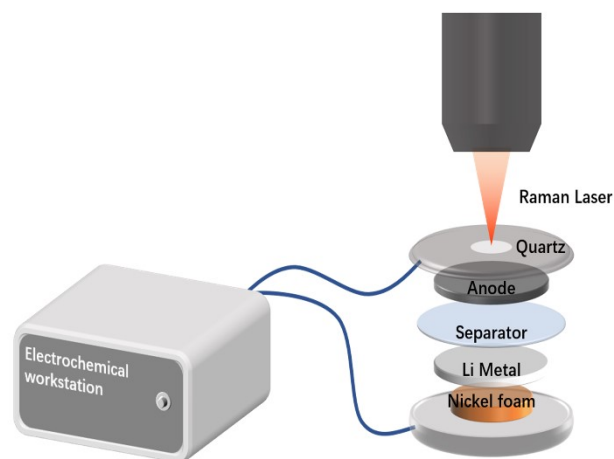
**Fig. S3.** CV curves of (a) ZCO/CC and (b) SZCO/CC. GCD curves of (c) ZCO/CC and (d) SZCO/CC at 2 mA cm<sup>-2</sup>.



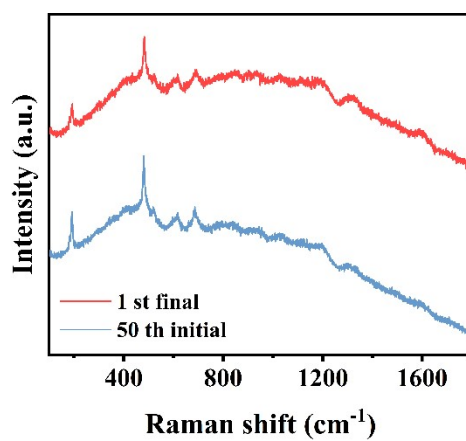
**Fig. S4.** Locally magnified CV curves of (a) SZCO/CC and (b) CSZCO/CC at a scan rate of  $0.2 \text{ mV s}^{-1}$ . CV curves of (c) ZCO/CC and (d) SZCO/CC at a scan rate of  $0.1 \text{ mV s}^{-1}$ .



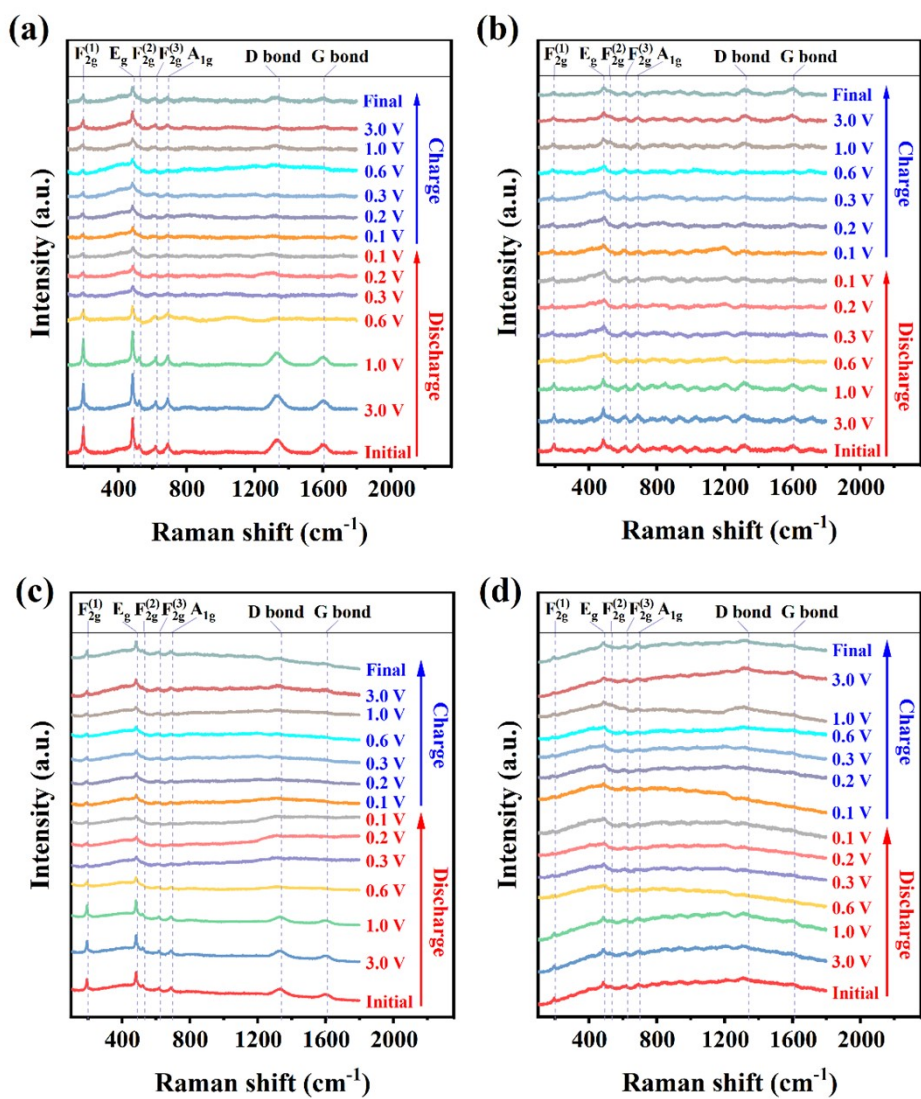
**Fig. S5.** XPS spectra of (a) survey, (b) Si 2p, and (c) Zn 2p.



**Fig. S6.** Diagram of in-situ Raman test.



**Fig. S7.** Raman spectra of CSZCO/CC after charge in the 1<sup>st</sup> cycle and before discharge in the 50<sup>th</sup> cycle.



**Fig. S8.** In-situ Raman spectra of ZCO/CC (a) 1<sup>st</sup> and (b) 50<sup>th</sup>, of SCZO/CC (c) 1<sup>st</sup> and (d) 50<sup>th</sup> from 100 to 1800  $\text{cm}^{-1}$ .

	CC (~12.8 mg)	ZCO/CC (~1.2 mg)	SZCO/CC (~1.4 mg)	CSZCO/CC (~1.5 mg)
Areal capacity (mAh cm <sup>-2</sup> at 5 mA cm <sup>-2</sup> )	0.37	0.63 (593 mAh g <sup>-1</sup> )	0.86 (694 mAh g <sup>-1</sup> )	1.16 (874 mAh g <sup>-1</sup> )

**Table S1.** The Areal capacity of puer CC, ZCO/CC, SZCO/CC, and CSZCO/CC at 5 mA cm<sup>-2</sup>.

For example, the ZCO/CC electrode had a areal capacity of 0.63 mAh cm<sup>-2</sup> after 500 cycles at a current density of 5 mA cm<sup>-2</sup>, and the CC electrode had a areal capacity of 0.37 mAh cm<sup>-2</sup>.

So, the capacity contribution of the CC electrode was  $0.37/0.63 = 59\%$ .