## **Electronic Supplementary Information**

## Highly rough copper current collector: improving adhesion property between silicon electrode and current collector for flexible lithium-ion batteries

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Fig. S1. Adhesion strength (vs time) of (a) Si/fCu/622 and (b) Si/rCu/622 during peeling mode in SAICAS.



Fig. S2. Schematic illustrating the peeling test of (a) Si/fCu and (b) Si/rCu using a SAICAS.



**Fig. S3.** Cross-sectional SEM images of (left) Si/fCu/622 and (right) Si/rCu/622 cutted with FIB after 30 cycles relevent to Fig. 6b.



**Fig. S4.** Cross-sectional SEM images of (left) Si/fCu/811 and (right) Si/rCu/811 cutted with FIB after 30 cycles relevent to Fig. 6d.



Fig. S5. Impedance spectra of the (a) Si/fCu/622 and Si/rCu/622 and (b) Si/fCu/811 and Si/rCu/811 after precycling relevant to Fig. 6a and 6c, respectively.



Fig. S4. Optical images of the pouch-type flexible cell rolled conformation with a radius of 6.5 mm.