

Supporting Information

Robust Micron-sized Silicon Secondary Particles Anchored by Polyimide as High-capacity High-stability Li-ion Battery Anode

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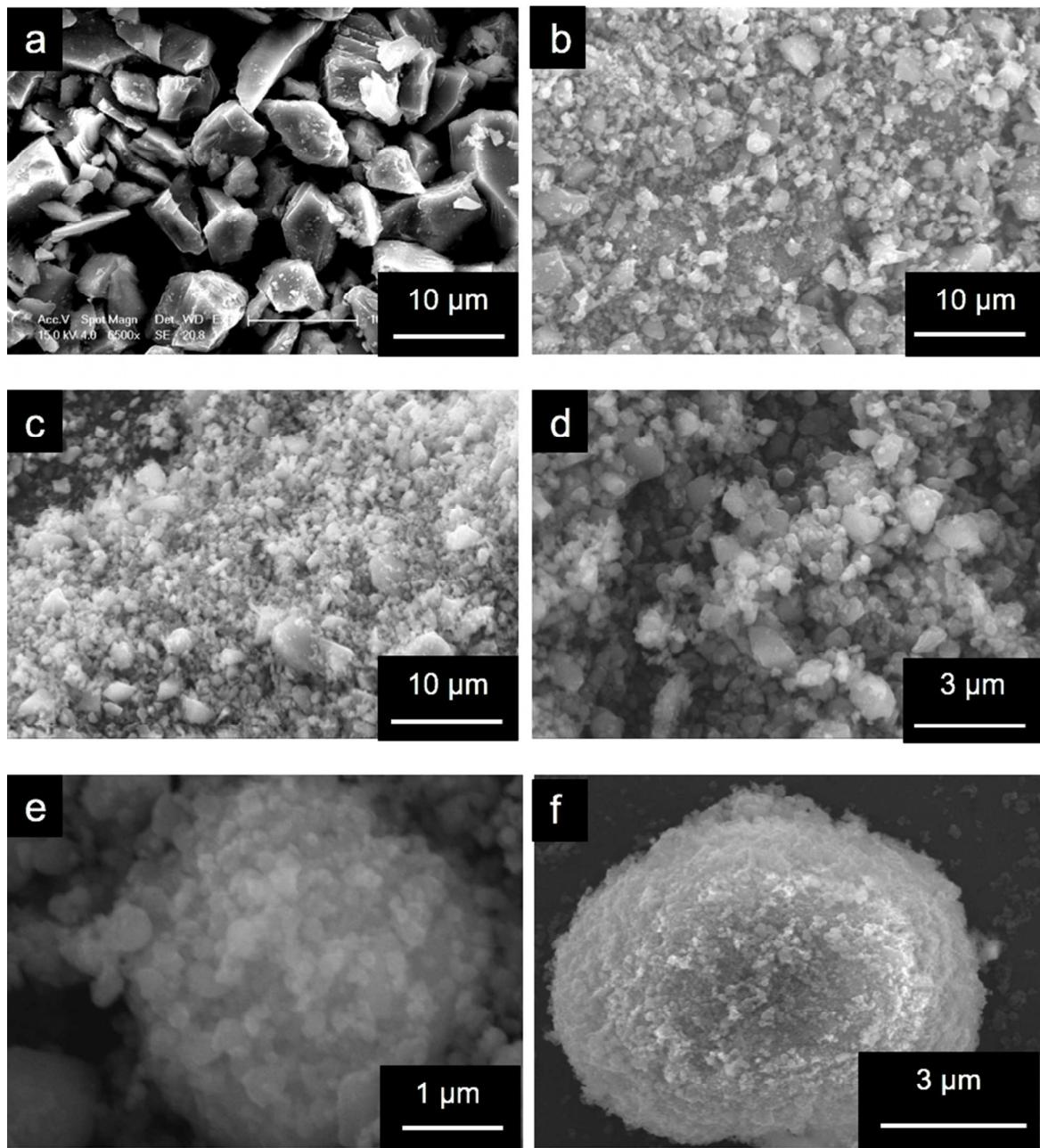


Figure S1. SEM image of Si particles after a) 0 hr, b) 0.5 hr, c) 1 hr, d) 2 hrs , e) 4 hrs and f) 6 hrs.

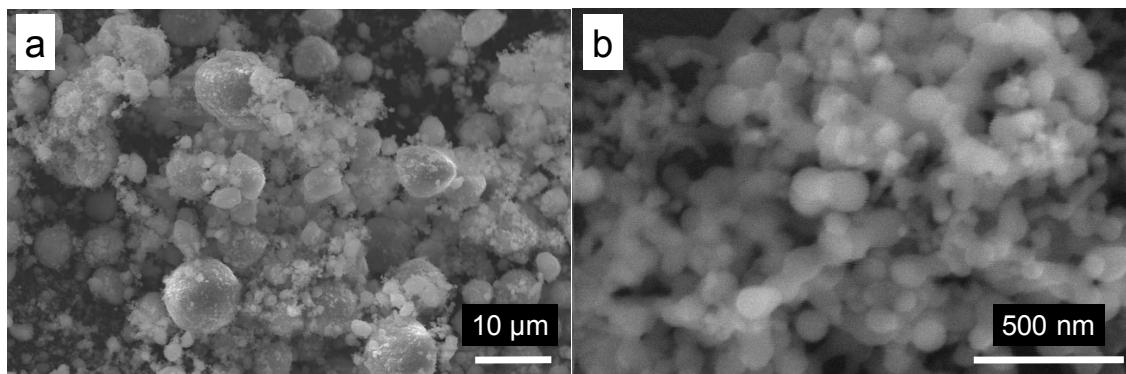


Figure S2. a) SEM image of Si-200 and b) n-Si.

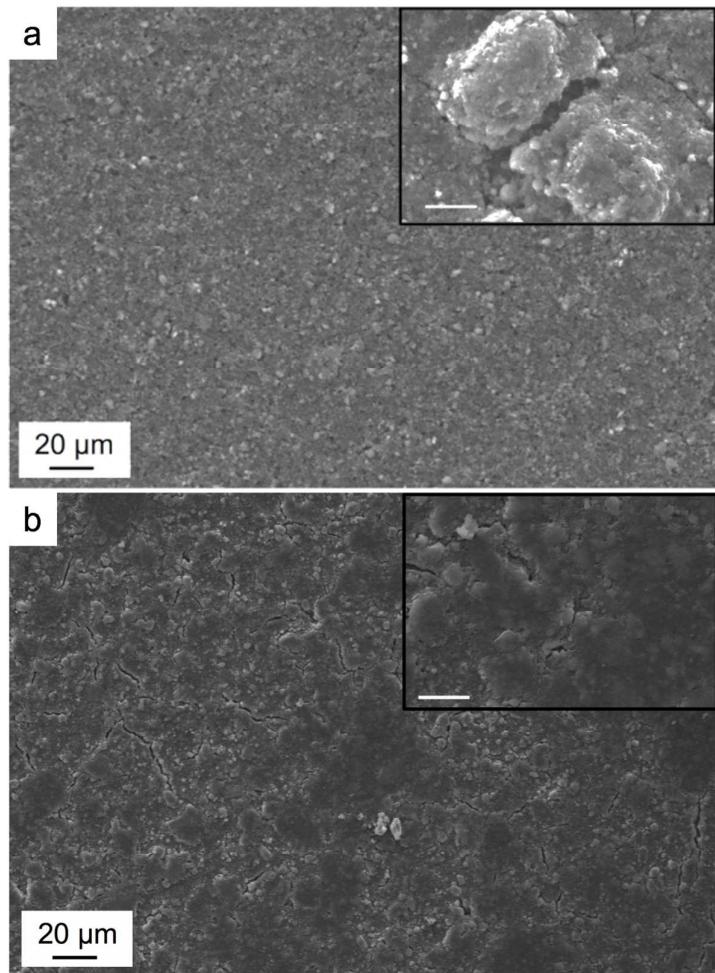


Figure S3. SEM images of SiSPC electrode surface (a) before and (b) after calendering. The scale bar of the inset is 5 μm .

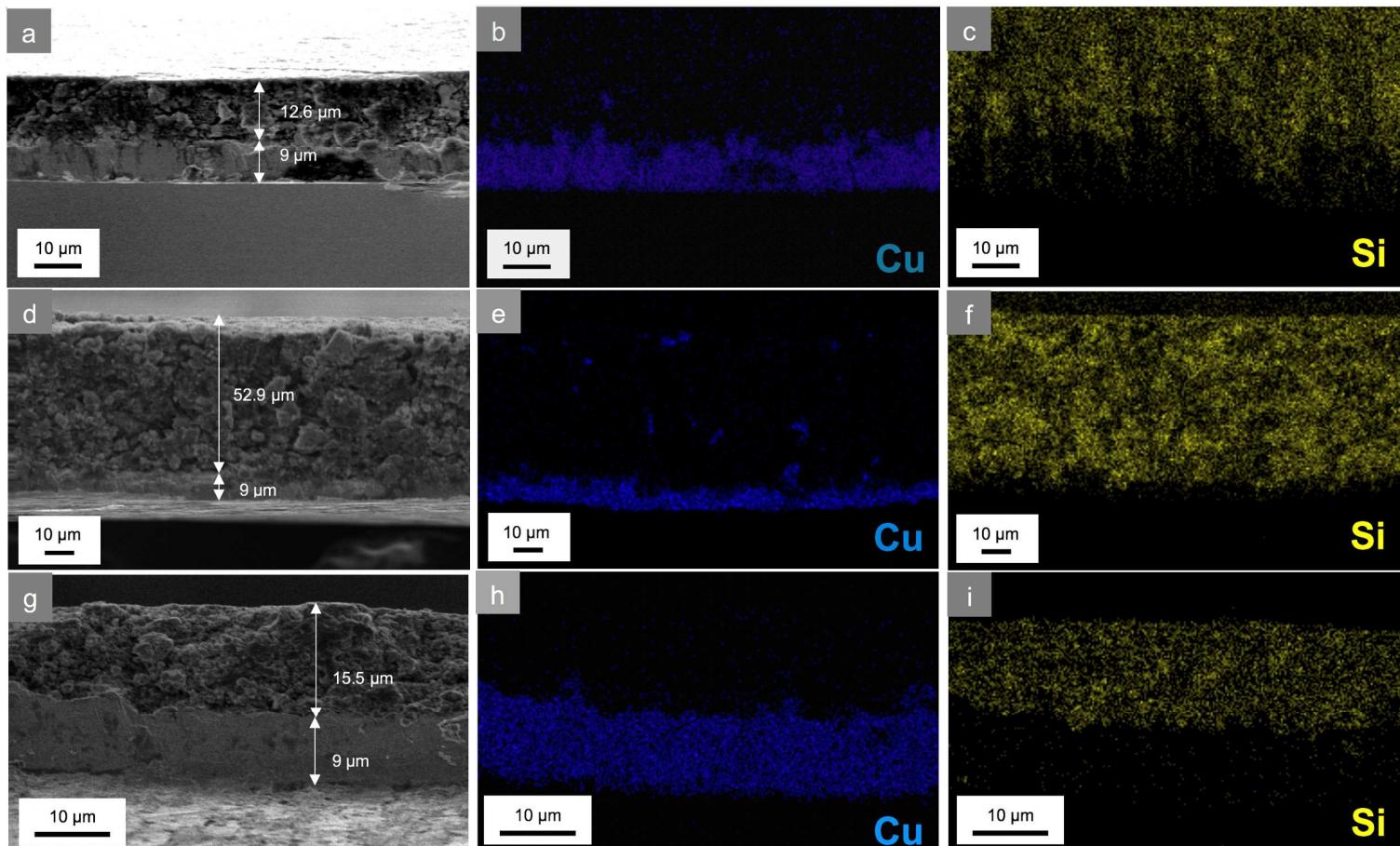


Figure S4. Cross-sectional SEM images and corresponding EDX mappings of SiSPC electrodes (a-c) pristine electrode, (d-f) electrode after lithiation (10th cycle) and (g-i) electrode after delithiation (10th cycle). Thickness of the Cu current collector is about 9 µm.

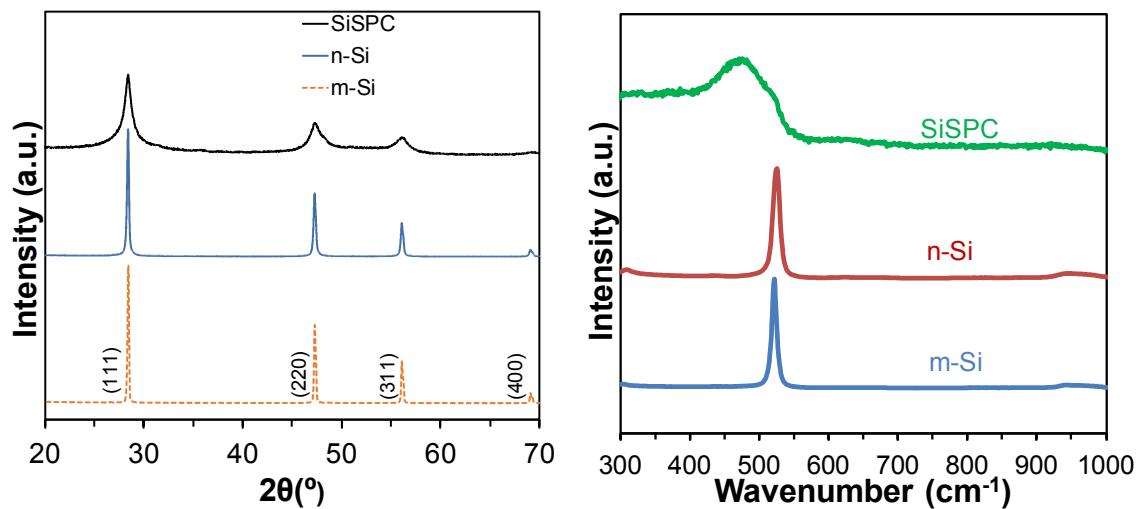


Figure S5. a) X-ray diffraction patterns and b) Raman spectroscopy of m-Si and SiSPC.

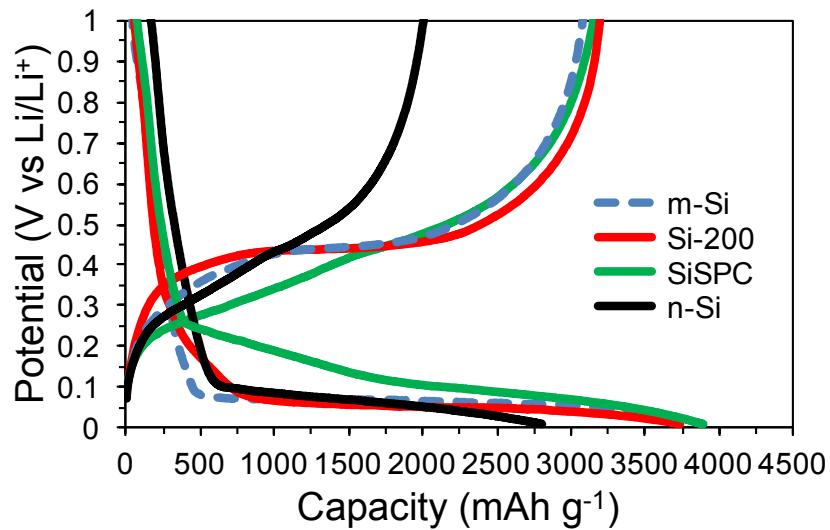


Figure S6. 1st charge-discharge curves of m-Si, Si-200, SiSPC and n-Si with 20 wt% PI binder.

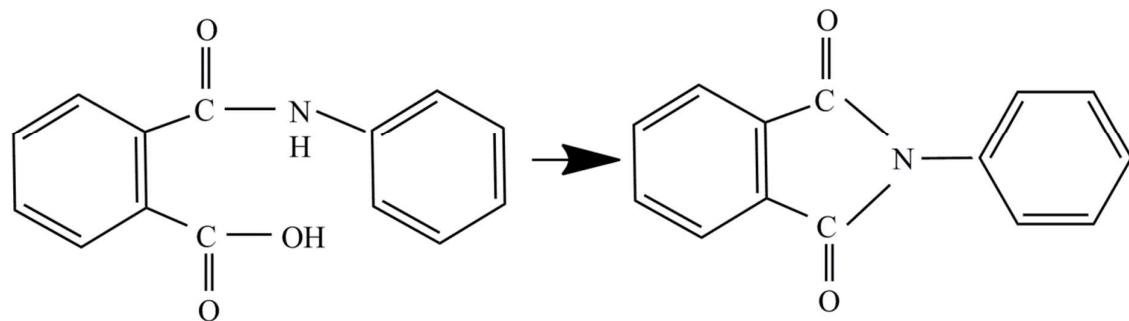


Figure S7. Ring closing reaction of polyimide.

Table S1. Summary of the result of this work and other works**Studies using micron-sized Si particles as precursor**

Averaged capacity (mAh g ⁻¹)	Current (mA g ⁻¹)	Retention (n th cycle)	Ref.
~1750	2100	85% (300 th)	[1]
~2200	420	80% (90 th)	[2]
~1900	420	70% (100 th)	[3]
1860	3500	95% (500th)	This work

Electrochemical performance normalized by electrode mass loading

Averaged capacity (mAh cm ⁻²)	Current (mA g ⁻¹)	Retention (n th cycle)	Ref.
~2.2	250	~95% (100 th)	[4]
~3	220	~91% (100 th)	[5]
2.72	265	85% (130 th)	[3]
2.57	420	~80% (100 th)	[6]
~2.75	400	~84% (100 th)	[7]
~2.6	170	~87% (40 th)	[8]
~2	420	~82% (100 th)	[9]
~0.75	200	~85% (50 th)	[10]
3.57	250	92% (70th)	This work

Studies that conduct capacity limitation

Capacity limit (mAh g ⁻¹)	Current (mA g ⁻¹)	No. stable cycle	Ref.
1000	1000	930	[11]
1000	4200	1000	[12]
1200	1200	1300	[13]
1000	3500	1280	This work

Reference

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