Electronic Supplementary Material (ESI) for New Journal of Chemistry.
This journal is © The Royal Society of Chemistry and the Centre National de la Recherche Scientifique 2022

Supporting Material

The purification of silicon from waste photovoltaic-cells and its value-added application in lithium-ion batteries

Zhao Zhang [1,2], Nina Yang[1,5], Fengshuo Xi [1,2], Xiuhua Chen [3], Shaoyuan Li [1,2,4]*, Wenhui Ma [1,2]*, Yu Lei[5], Rong Deng [4]

[1] *Faculty of Metallurgical and Energy Engineering/State Key Laboratory of Complex Nonferrous Metal Resources Clean Utilization, Kunming University of Science and Technology, Kunming 650093, China*

[2] *Silicon Material Industry Research Institution (Innovation Center) of Yunnan Province, Kunming 650093, China*

[3] *School of Materials Science and Engineering, Yunnan University, Kunming 650091, China*

[4] *School of Photovoltaic and Renewable Energy Engineering (SPREE), University of New South Wales, Sydney, 2052, Australia*

[5] *Xi'an Mingde institute of technology, Xi'an, 710000, China*

[*] *Corresponding Authors: lsy415808550@163.com (S. Li); mwhsilicon@126.com (W. Ma);*

Results and Discussion

TableS1. Structural parameters of bare Si, PSi

Sample	Surface are(m^2g^{-1})	Pore volume(cm^3g^{-1})	Pore size(nm)
Bare Si	**1.778**	**0.008**	**3.806**
Si	**9.198**	**0.069**	**3.796**

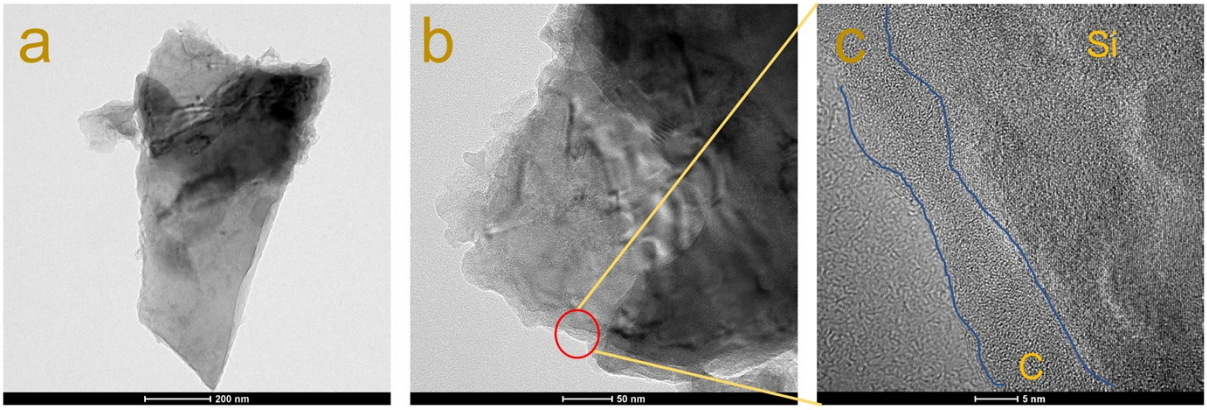
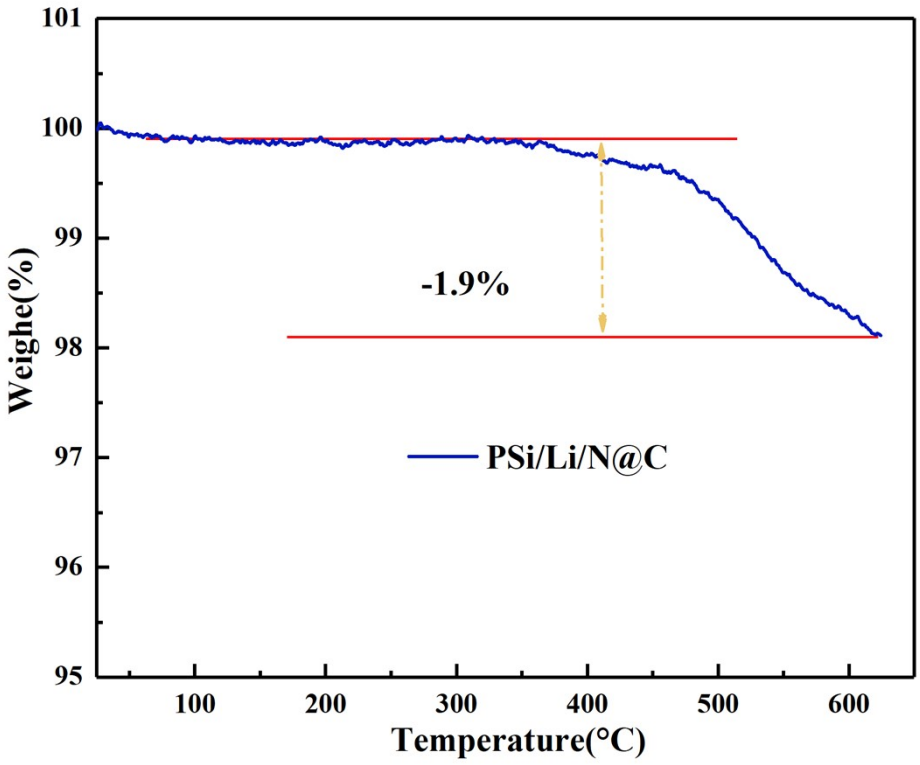


Figure S1. HRTEM images of (a,b,c) PSi/Li/N@C.



FigureS2. TGA curves of PSi/Li/N@C composite.

Table S2. Comparison of electrochemical performance in this work with previously published reports on waste photovoltaic cells as anode materials.

Active materials	Synthesis methods	Specific capacity (mA h g^{-1})	Cycle number	Current density (mA g^{-1})	References
P-Si	Molten salt electrolysis and alloying	~2700	500	1500	Waste Management. 2021, doi.org/10.1016/j.wasman.2021.08.037
WSNPs@C	CNTs Balling milling and Dopamine Hydrochloride	~1200	50	800	SSRN, 2020, doi.org/10.2139/ssrn.3751571
The ultra-pure Si	Planetary Ball Milling	~2000	50	1500	ACS Sustainable Chem. Eng. 2020, DOI: 10.1021/acssuschemeng.9b07434
PSi/Li/N@C	**Metal-assisted chemical etching and carbon-coated**	**1400**	**120**	**685**	**Our work**