Supplementary materials

Honeycomb-like micro-/nano-hierarchical porous germanium for high-performance lithium-ion battery anode

Ya Zheng[a], Xiaocheng Li[a, c*], Juan Liu[b], Xiaoyu Zhao[a], Nengwen Ding[a, c], Qian Zhang[a, c*], Shengwen Zhong[a]

[a]*Jiangxi Province Key Laboratory of Power Battery and Materials, Faculty of Materials Metallurgy and Chemistry, Jiangxi University of Science and Technology, Ganzhou 341000, P.R. China.*
[b]*Jiangxi Province Key Laboratory of Mining Engineering, School of Resources and environmental Engineering, Jiangxi University of Science and Technology, Ganzhou 341000, PR China.*
[c]*Yichun Lithium New Energy Industry Research Institute, Jiangxi University of Science and Technology, Yichun 360904 P.R. China*

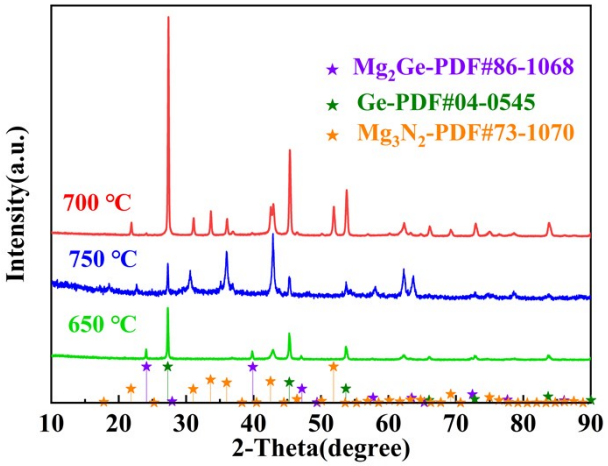

Fig. S1 XRD patterns of Mg_2Ge after nitriding at different temperatures

* Corresponding authors.
Email: xiaocheng_li@jxust.edu.cn; zhangqian@jxust.edu.cn

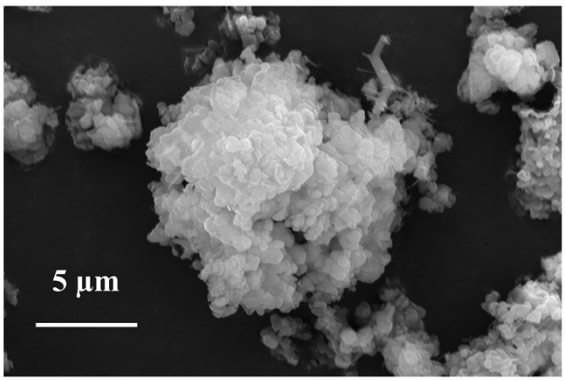

Fig. S2 SEM image of Mg_2Ge after nitriding

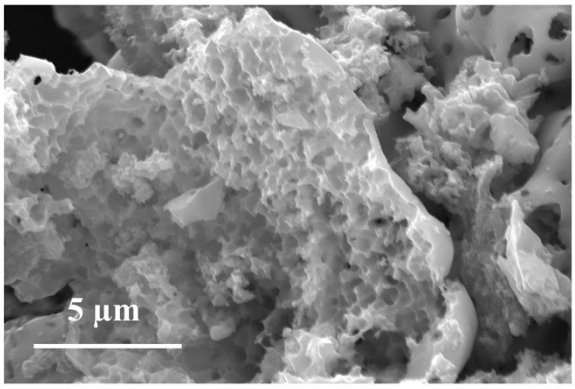

Fig. S3. SEM image of the broken part of hp-Ge particles

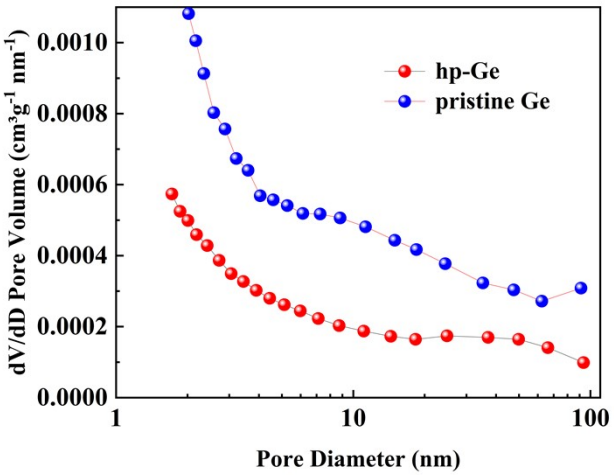

Fig. S4. Pore size distribution of hp-Ge and pristine Ge

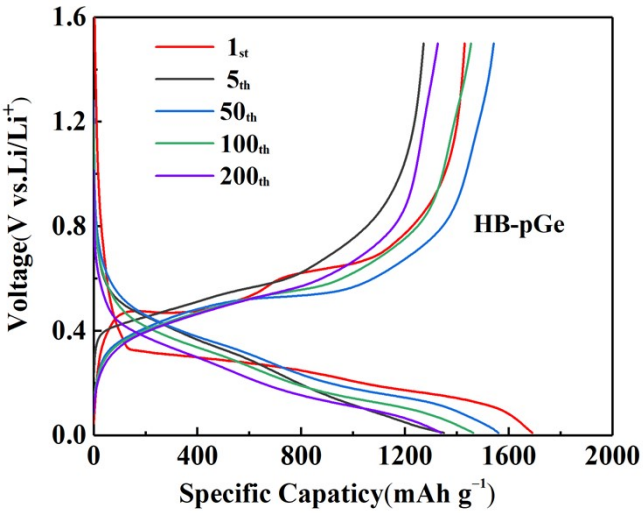

Fig. S5. Discharge/charge potential profiles of hp-Ge electrode at 0.5 A g^{-1}.

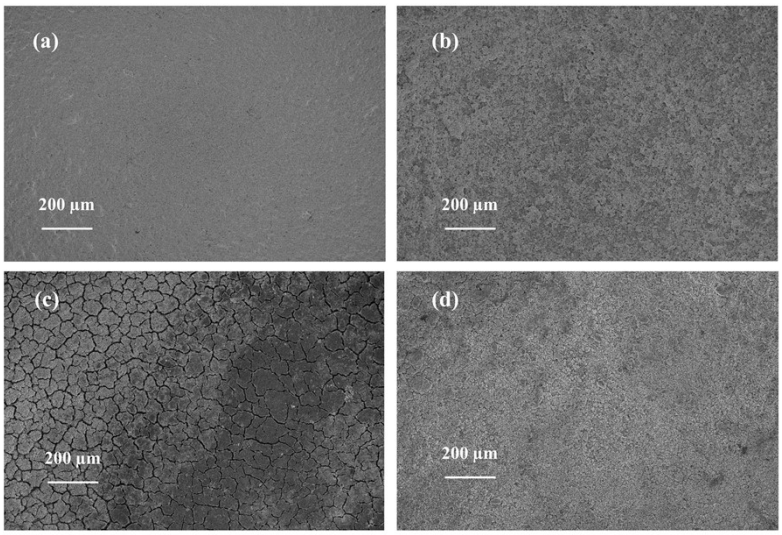

Fig. S6 (a, c) SEM images of the pristine Ge electrode surface before and after cycling; (b, d) SEM images of the hp-Ge electrode surface before and after cycling

Table S1 Comparison of the electrochemical performance of hp-Ge electrode with those in previous reports

Sample	Synthesis method	Capacity (mAh g^{-1} @ A g^{-1})	Cycling stability: Capacity (mAh g^{-1}@ A g^{-1}), after (n) cycles, capacity retntion of (x) %	Rate capability (mAh g^{-1}@A g^{-1})	Ref.
Ge nanoparticles /graphene oxide	Sodium-reduced	738 @ 0.2	532 @ 0.2，after 15 cycles, 72%	/	1
Inverse opal Ge film	Electrodeposition from an ionic liquid	1024 @ 0.2 C[a]	844 @ 0.2 C after 50 cycles[a]	About 500 mAh g^{-1} @2.25C[a]	2
Ge@C/rGO hybrids	High energy mechanical milling	1258.5 @ C/10[a]	1074.4 @ 2C, after 600 cycles, 96.5%	436 @ 20 C	3
mesoporous Ge particles	Zincothermic reduction	1450 @ 0.5 C[a]	0.5 C, after 100 cycles, 99.9%	400@ 2 C	4
Ge@C nanowires	PVD	1332 @ 0.5 C[a]	1086 @0.5 C, after 200 cycles, 91%[a]	181 @ 24	5
Ge/3DOM-Ni	Drop-casting PS template/ electrodeposition of	996 @ 0.2 C[a]	610 @ 0.2 C, after 100 cycles, 61.2%	270 @ 10 C[a]	6

honeycomb-like porous Ge	3DOM-Ni /reduction of GeO_2 by $NaBH_4$ thermal nitridation of the Mg_2Ge in N_2	1534.7 @ 0.2	1375.40 @0.5, after 200 cycles, 93.12%	483.9 @ 8	This work

Note: [a]1C is approximately 1600 mA g^{-1}

Table S2 EIS was fitted to the data before and after cycles

Simples	R_S(ohm)	*Rct*(ohm)
hp-Ge	4.193	158.7
Ge	7.603	164.00
After 3 cycles of hp-Ge electrode	3.446	52.880
After 3 cycles of pristine Ge electrode	4.234	122.70

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