

Supplementary Information

UV-assisted, Template-free Electrodeposition of Germanium Nanowire Cluster Arrays from an Ionic Liquid for Anodes in Lithium-ion batteries

Caixia Chi ^{a,b}, Jian Hao ^{a,e}, Xusong Liu ^a, Xiaoxuan Ma ^a, Yu Yang ^a, Xiaoxu Liu ^a, Frank Endres ^d, Jiupeng Zhao ^{a,*}, Yao Li ^{c,*}

^aSchool of Chemistry and Chemical Engineering, Harbin Institute of Technology, 150001, Harbin, China

^bFood and Pharmaceutical Engineering College, Suihua University, 152061, Suihua, China

^cCenter for Composite Materials, Harbin Institute of Technology, 150001, Harbin, China

^dInstitute of Electrochemistry, Clausthal University of Technology, Arnold-Sommerfeld-Strasse 6, 38678 Clausthal-Zellerfeld, Germany

^eState Key Laboratory of High-efficiency Coal Utilization and Green Chemical Engineering, Ningxia University, 750002, Yinchuan, China

* Corresponding author.

Email address: jpzhaoh@hit.edu.cn (Jiupeng Zhao), yaoli@hit.edu.cn (Yao. Li)

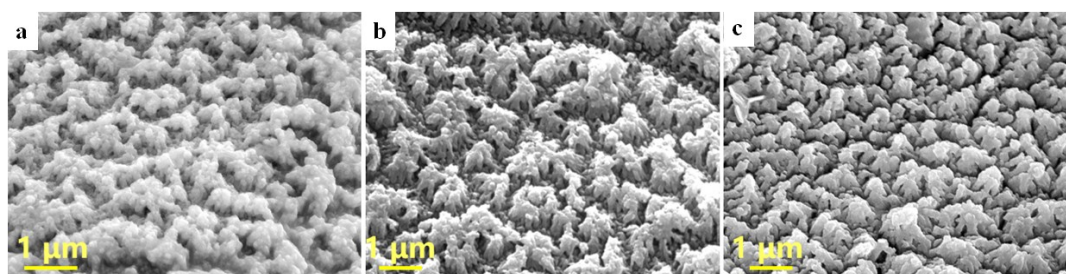


Fig.S1. SEM images of Ge deposits at different deposition times with UV irradiation.

(a) 10 min (b) 20 min (c) 40 min

Table. S1. Deposition weight of Ge deposits at different deposition times with UV irradiation

Deposition time(min)	10	20	30	40
Weight (mg)	0.16	0.25	0.35	0.37

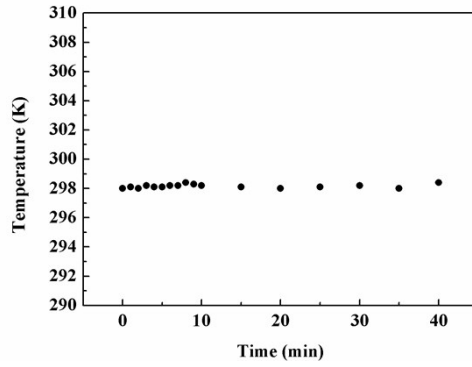


Fig.S2. Temperature change of the electrolyte with UV irradiation time.

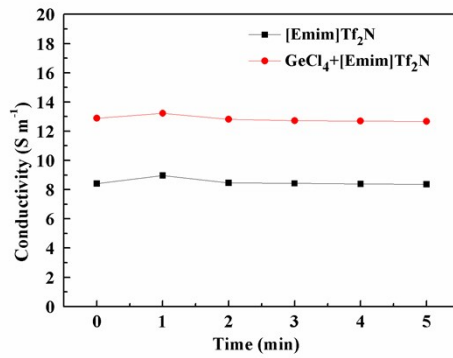


Fig.S3. Conductivity change of the pure ionic liquid and electrolyte with UV irradiation time.

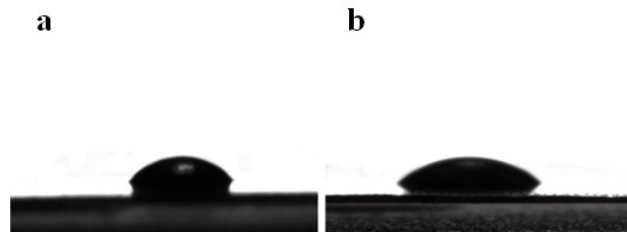


Fig.S4. Image of electrolyte on Ni foil surface

(a) electrolyte without UV irradiation and (b) electrolyte with UV irradiation 1 min before CV measurements

Table S2. Summary of the electrochemical performance of Ge nanostructures materials.

Materials	Cycling performance(mA h g ⁻¹)	Rate capability(mA h g ⁻¹)	Initial Coulomb efficiency (%)
Ge nanowires by a solution-liquid-solid (SLS) growth process ¹	920.5 after 15cycles at 0.05C		~43.7
Ge nanotubes synthesized on the Kirkendall effect following by an annealing treatment ²	1002 after 50 cycles at 0.2 C	580 at 20 C	76
Ge nanowires via ionic liquid electrodeposition with subsequent	~1200 after 200 cycles at 0.1 C	620 at 5 C	81.3

annealing treatment ³			
lead seeded germanium nanowires by VLS and SLS growth process ⁴	1072 after 50 cycles at 0.5 C		~78
Ge nanotube arrays through template-assisted electrodeposition from an ionic liquid ⁵	1005 after 250 cycles at 0.2 C	818 at 2 C	~77
Ge nanowires by VLS growth process ⁶	~1000 after 20 cycles at 0.05 C	~600 at 2 C	39
Ge/C nanowires on carbon nanofibers by a self-assembly process ⁷	820 after 100 cycles at 0.1 C	484 at 10 C	82
crystalline Ge nanowire films produced by an electrochemical liquid-liquid-solid (ec-LLS) growth ⁸	973 after 20 cycles at 1 C		~74
Cu ₃ Ge-seeded Ge nanowires through a low-energy pyrolysis route ⁹	866 after 1900 cycles at 1 C	800 at 10C	~65
Ge nanowire growth by the vapor-liquid-solid (VLS) mechanism ¹⁰	~900 after 1100 cycles at 0.5 C	538 at 10 C	~74
Germanium coatings deposited on electrodeposited nickel nanocone-arrays by high frequency plasma enhanced CVD ¹¹	468 after 50 cycles at 0.5C		82.6
Amorphous Ge nanotubes via a template technique ¹²	1300 after 20 cycles at 0.05 C	700 at 2 C	~57
Ge NWCA in this work	740 after 200 cycles at 0.2 C	959 at 2 C	~65

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