

Supporting information

**Bimetallic Junction Mediated Synthesis of Multilayer Graphene Edges
towards Ultrahigh Capacity for Lithium Ion Battery**

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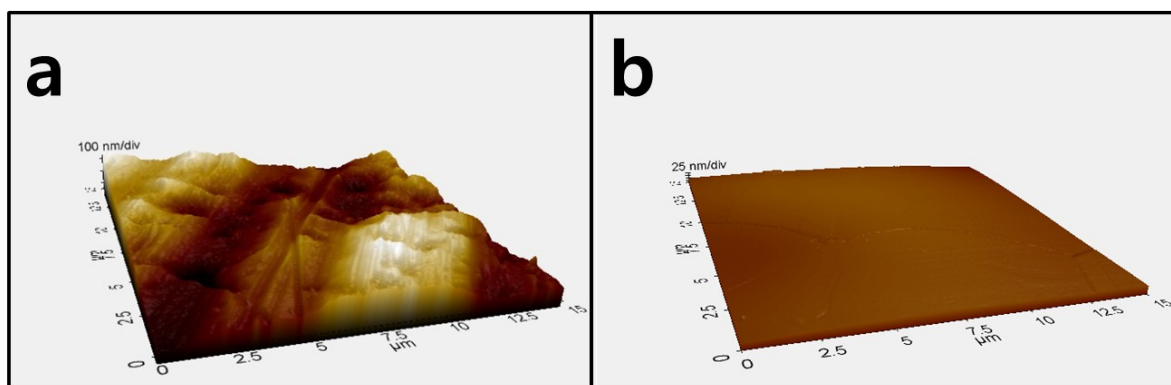


Figure S1 3D rendering of AFM images of Ni foil before (a) and after (b) polishing with a solution containing perchloric acid 20% and acetic acid 80% at 20 V for 1 min.

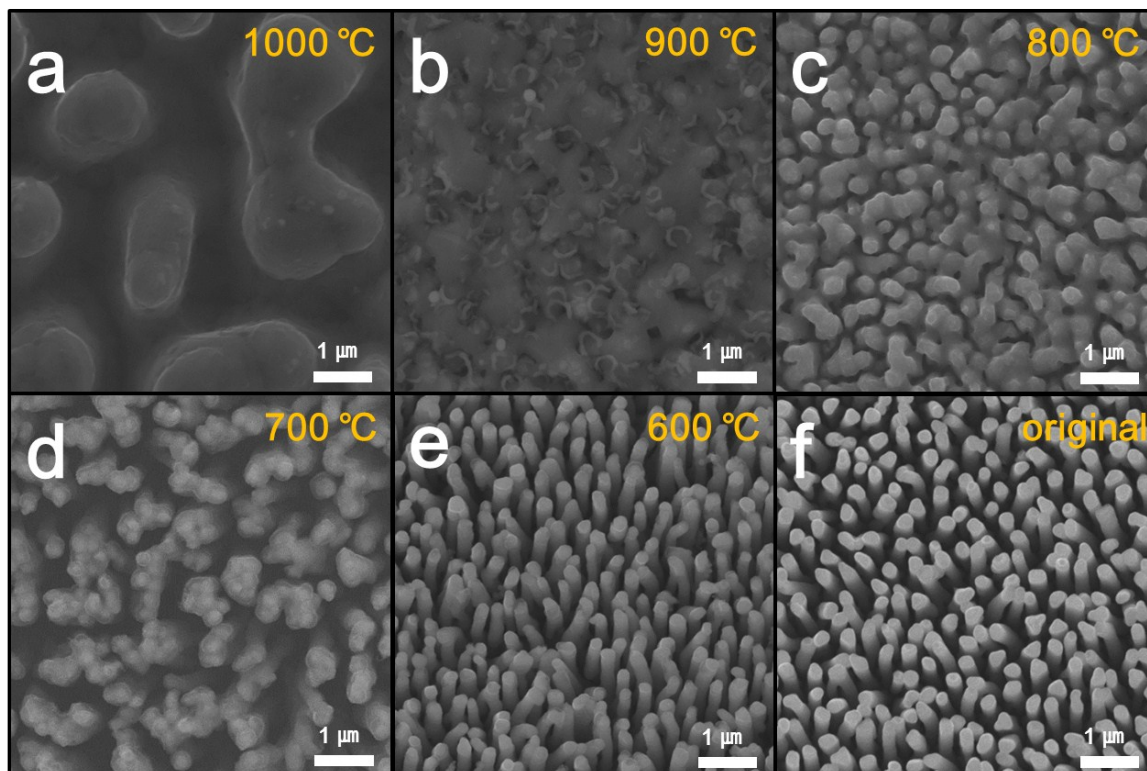


Figure S2 SEM images showing morphological change when graphene was formed on Ni nanorods at various temperatures, (a) 1000 °C, (b) 900 °C, (c) 800 °C, (d) 700 °C, (e) 600 °C, (f) original. 600 °C was used to synthesize graphene layers in this work.

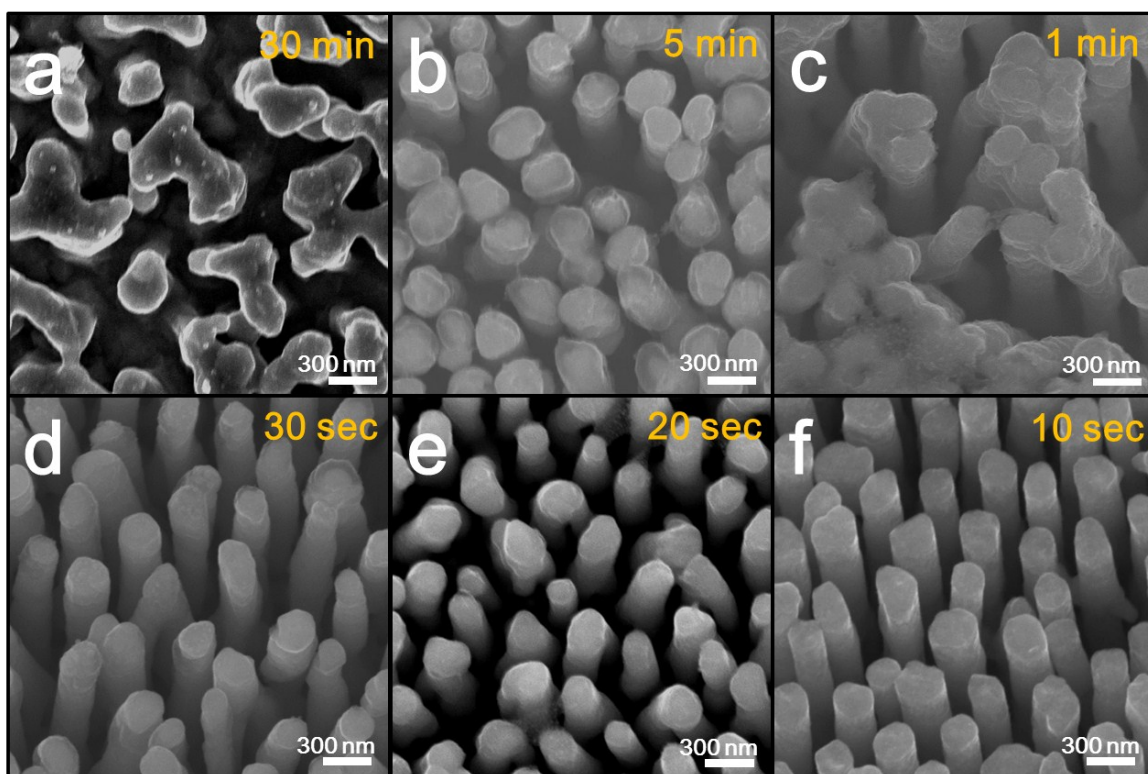


Figure S3 SEM images showing the morphologies of graphene deposited under various feeding time, (a) 30 min, (b) 5 min, (c) 1 min, (d) 30 s, (e) 20 s, (f) 10 s.

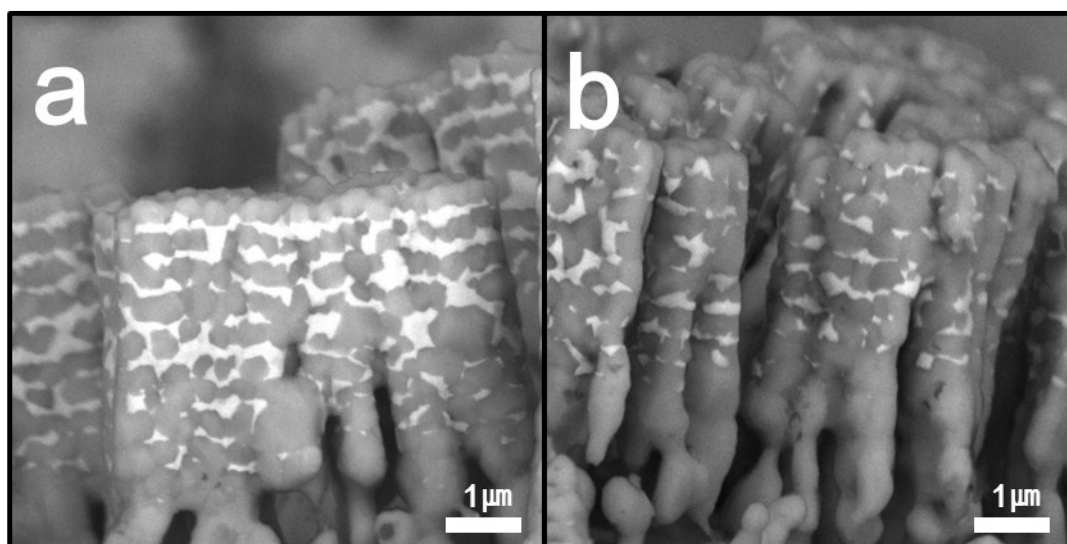


Figure S4 SEM images showing graphene deposited on Ni-(Au-Ni)₉ nanorods by CVD for 10 s at 650 °C (a) and 700 °C (b).

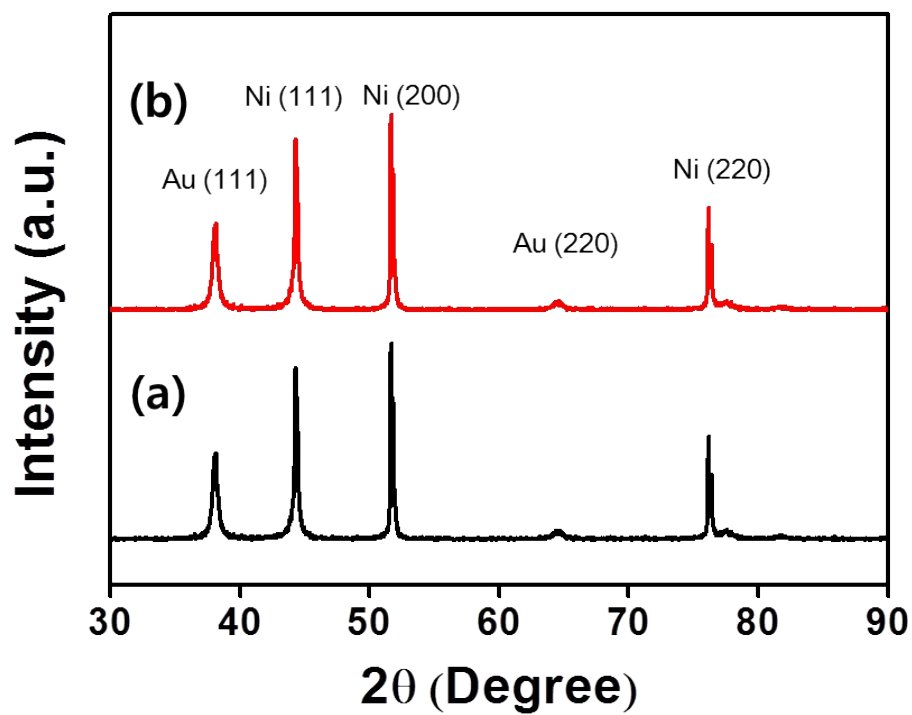


Figure S5 XRD pattern of (a) Ni-(Au-Ni)₉ nanorods without graphene and (b) graphene coated on Ni-(Au-Ni)₉ nanorods.

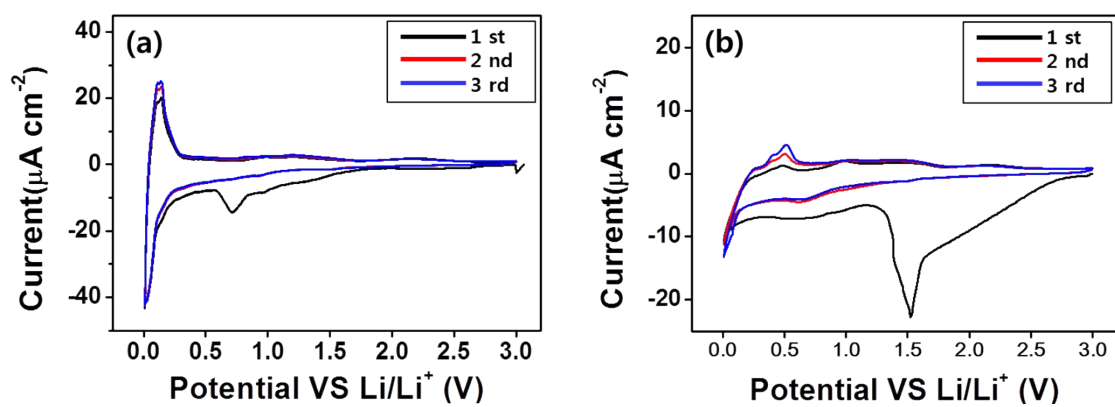


Figure S6 Cyclic voltammograms of graphene coated Ni nanorods (a) and Au nanorods (b).

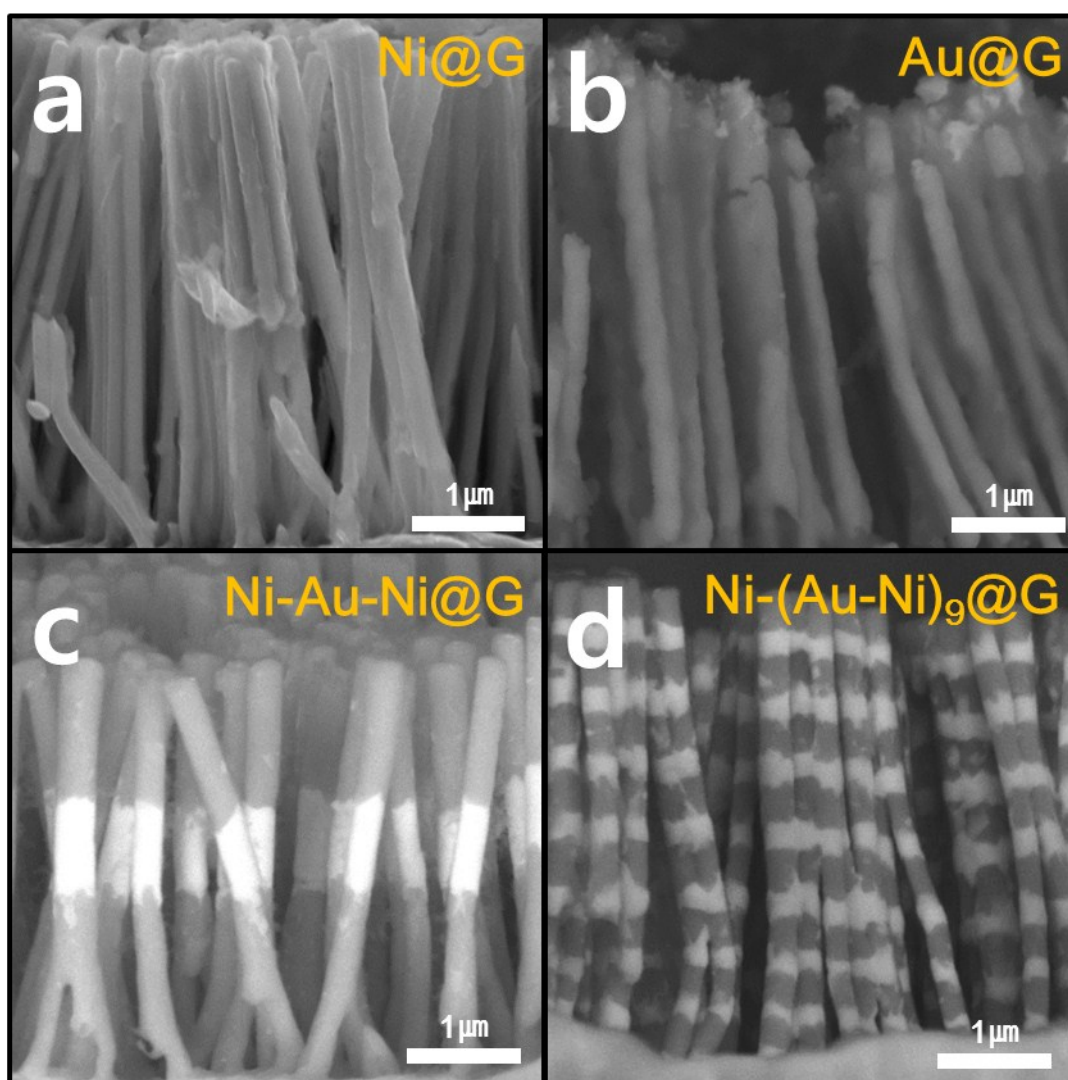


Figure S7 SEM images showing the morphologies of graphene coated nanorods structure after 500 cycles galvanostatic charge-discharge, (a) Ni, (b) Au, (c) Ni-Au-Ni, (d) Ni-(Au-Ni)₉.

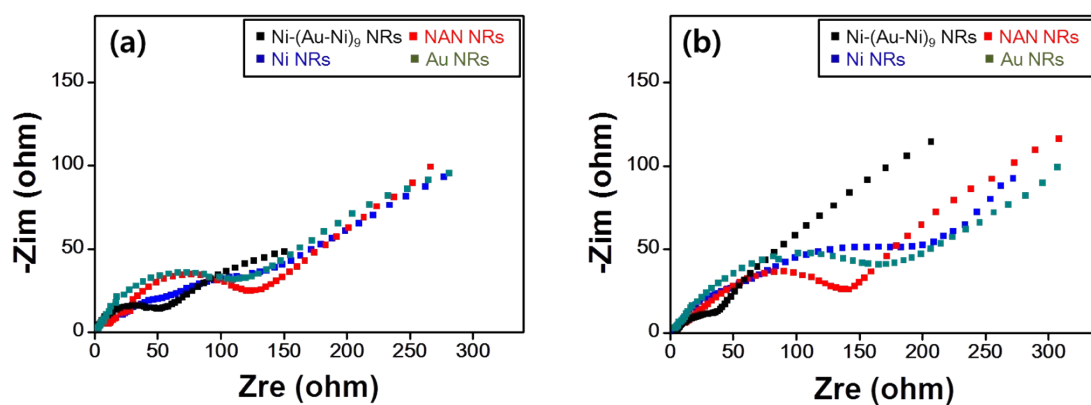


Figure S8 Nyquist plots of graphene coated Ni-(Au-Ni)₉ nanorods (black), Ni-Au-Ni nanorods (red), Ni nanorods (blue), and Au nanorods (cyan) (a) after 3 cycles, (b) after 500 cycles.

Table S1 Comparison of capacities between graphene coated Ni-(Au-Ni)₉ NRs and other graphene-based anode electrodes.

Electrode	Current density (A·g ⁻¹)	Capacity (mAh·g ⁻¹)	Reference
Ni-(Ni-Au) ₉ nanorods@graphene	2.6	4649	This work
Si-graphene composite	1	3200	[s1]
Graphene-Nanotube-Iron Hierarchical Nanostructure	0.1	1024	[s2]
Cu-supported graphene nanoflake	0.7	650	[s3]
Cu foil supported 3D RGO	2	500	[s4]
GC-Gs	2	1047	[s5]
N-S-codoped nGs@CNT	2	1089	[s6]
N-doped porous graphitic carbon spheres	0.05	704	[s7]

References

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