

Supporting Information

Direct grown of Si nanowire arrays on Cu foam with coral-like surface for lithium-ion batteries

Shilong Jing, Hao Jiang,* Yanjie Hu, Chunzhong Li*

Key Laboratory for Ultrafine Materials of Ministry of Education, School of Materials Science and Engineering, East China University of Science and Technology, Shanghai 200237, China

Email: jianghao@ecust.edu.cn (H. Jiang) and czli@ecust.edu.cn (C. Li)

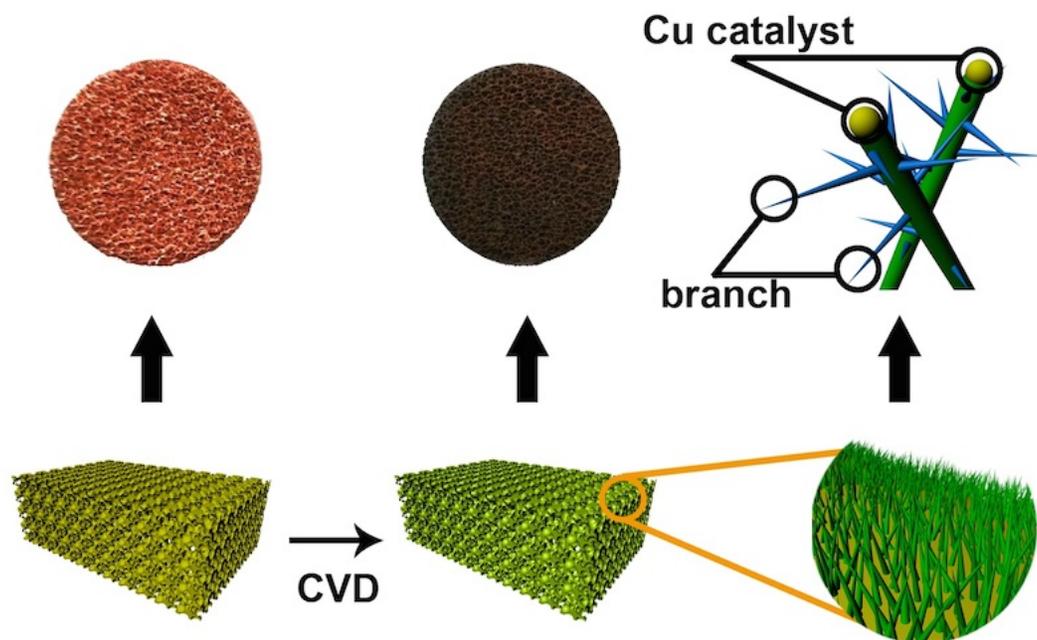


Fig. S1 Schematic illustration of the preparation of n-SNA with coral-like surface on Cu foam and the corresponding photographs of the anodes. The color of anode is transfer from red to brown after CVD.

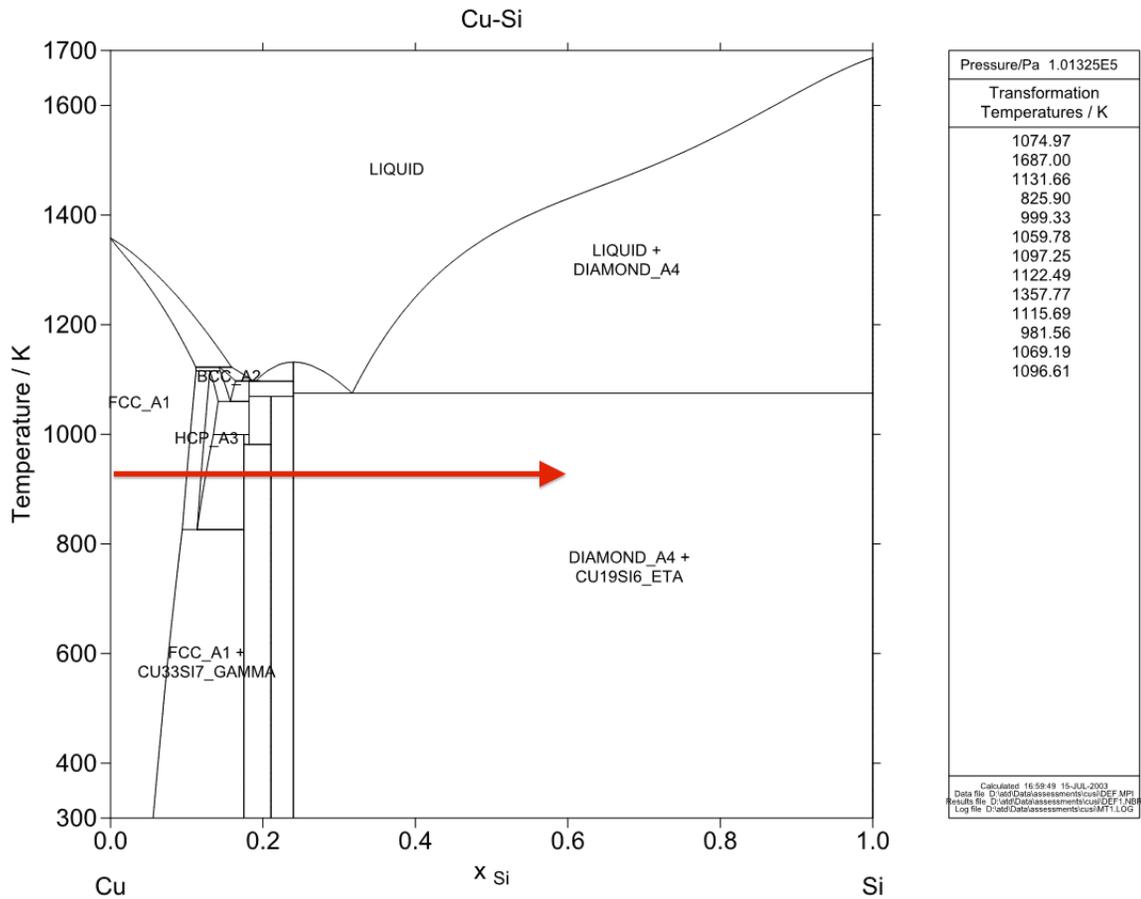


Fig. S2 Temperature–composition binary phase diagram of the Cu–Si system.

In principle, VSS growth should occur, rather than VLS, if the growth temperature is below the eutectic temperature of the semiconductor and the metallic starting material. For n-SNA in this work, the CVD process was possessed at 650 °C. Therefore, the mechanism of the Si NWs catalyzed by Cu catalyst is VSS.

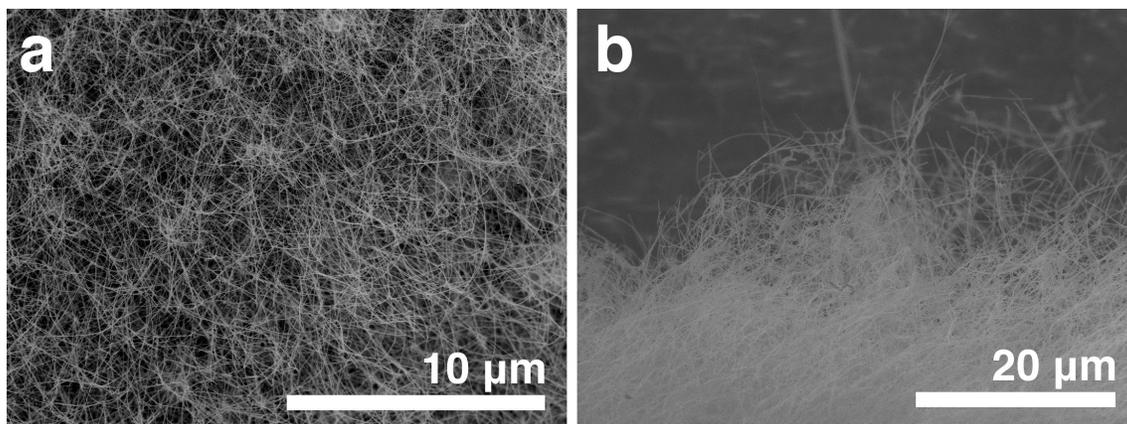


Fig. S3 SEM images of smooth Si NWs arrays on Cu slice from (a) top-view and (b) side-view.

It can be observed that the c-SNWAs were prepared on Cu slice with average length of 40 μm.

Compare to n-SNWAs, this control sample was grown with smooth surface and without branches near the terminal. On the other hand, the c-SNWAs performed inferior on both rate and cycle test. This was due to its very length, which is difficult for electron transfer from bottom to top. Additionally, the c-SNWAs without entangled nanowires were easily detached from Cu slice during cycling.