

Supporting Information

Unveiling the Formation Pathway of Single Crystalline Porous Silicon Nanowires

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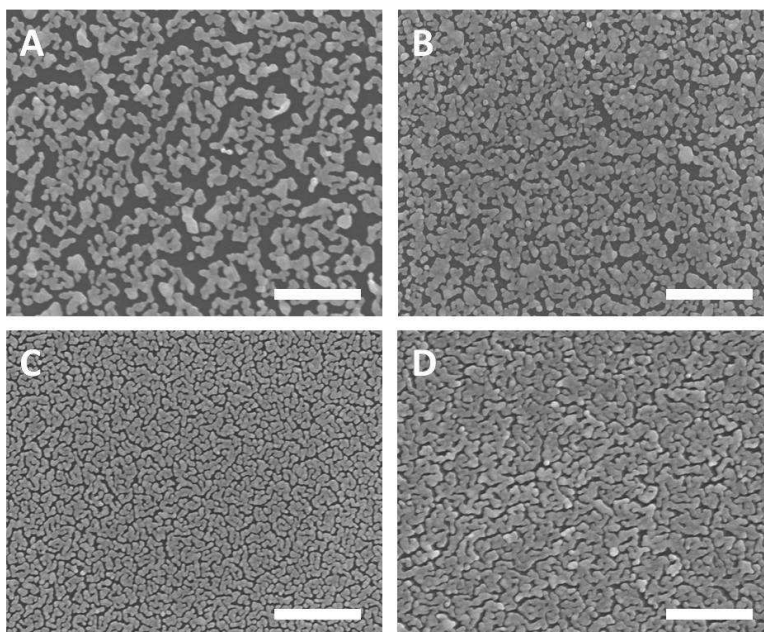


Figure S1. Four types of silicon wafers soaked into a solution composed of 0.005 M AgNO₃ and 4.8 M HF for 1 minute (A) 1-5 Ω·cm silicon wafer (B) 0.3-0.8 Ω·cm silicon wafer (C) 0.008-0.016 Ω·cm silicon wafer (D) 0.001-0.002 Ω·cm silicon wafer. The scale bars are 500 nm. **NOTE:** The SEM image shows that the amount of the Ag nucleated on silicon surface increases with increasing dopant concentration of the wafer.

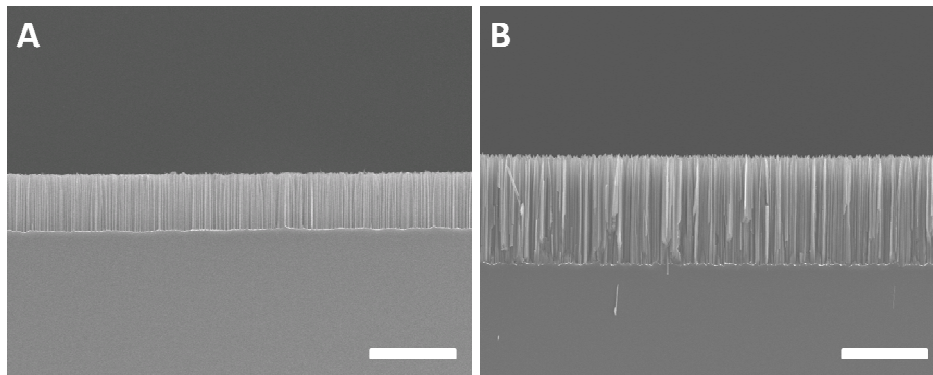


Figure S2. Cross sectional SEM images of nanowires obtained from 1-5 $\Omega\cdot\text{cm}$ wafers with different amount of evaporated Ag etched in 0.3 M H_2O_2 for 15 minutes. (A) Nanowires from silicon wafer with 10 nm thickness of Ag. (B) Nanowires from silicon wafer with 20 nm thickness of Ag. The scale bars are 10 μm . **NOTE:** This study shows that the vertical etching rate is positively correlated with the amount of Ag deposited on the wafer.

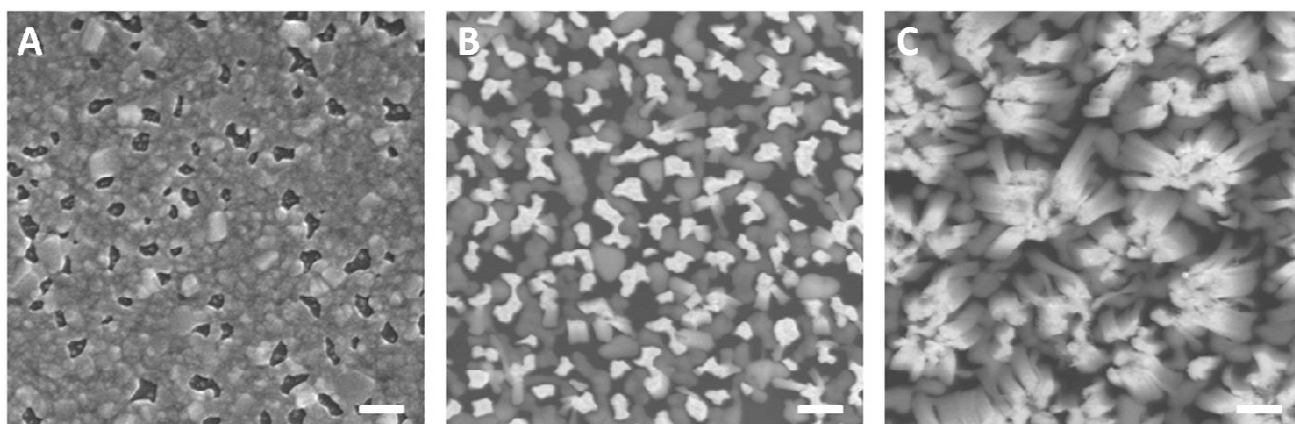


Figure S3. Surface evolution of the silicon wafer (0.008-0.016 $\Omega\cdot\text{cm}$) with evaporated Ag-film as a function of time (T). (A) T=0 minutes (B) T=1 minutes (C) T=3 minutes. The scale bars are 100 nm. **NOTE:** Before reaction, there is a nearly continuous Ag film on top of silicon wafer. After immersing in etchant solution for 1 minute, the Ag film forms islands and silicon nanorods start to show up. For the reaction of 3 minutes, bunches of typical silicon nanowires form.

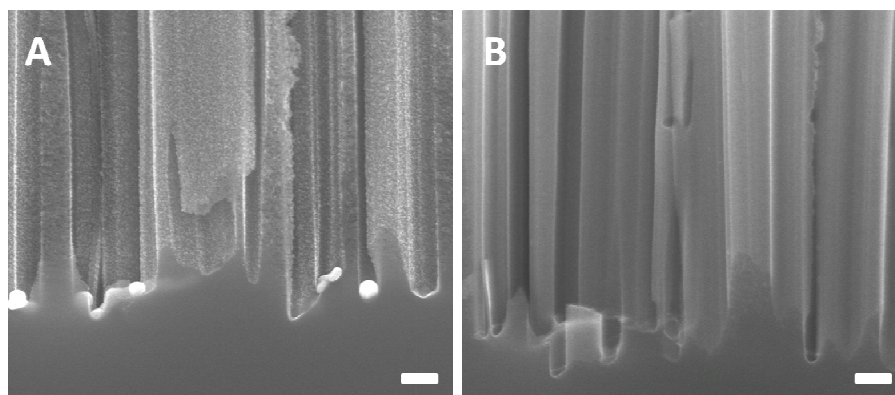


Figure S4. Cross sectional SEM images of nanowires obtained from 0.008-0.016 $\Omega\cdot\text{cm}$ wafers after etching in 0.3 M H_2O_2 for 15 minutes. (A) There are a large number of specks on the nanowires and a few Ag particles at the roots before immersing in the nitric acid solution. (B) Most of the specks on the nanowires and the Ag particles at the roots disappeared after immersing in the nitric acid for one hour, indicating that these specks are small Ag nanoparticles. The scale bars are 200 nm.