

Supplementary Information

Sonochemical nanoplunger: crystalline gold nanowires by cavitation extrusion through nanoporous alumina

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1. TEM Characterization of the Nanowire Structure

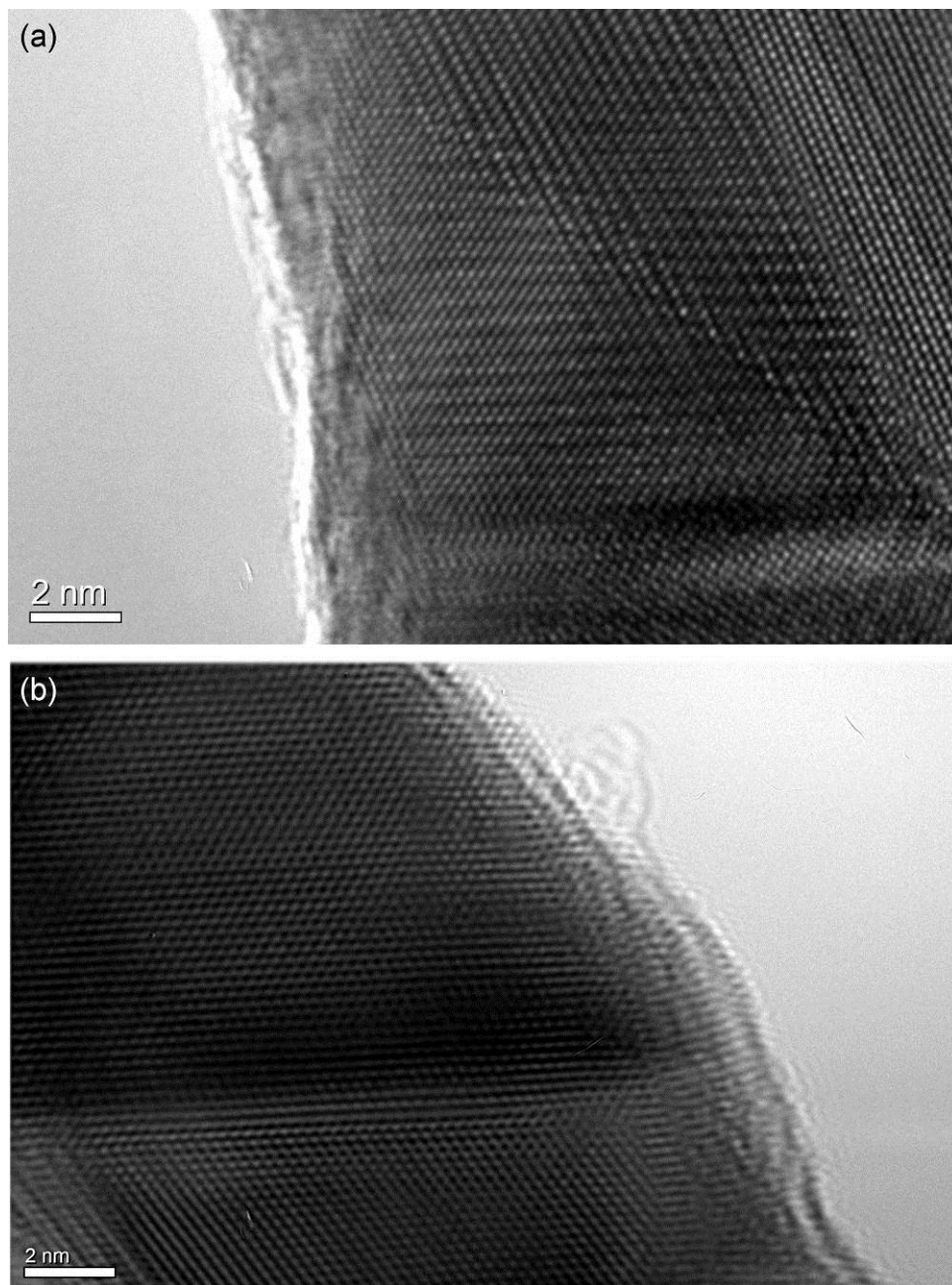


Figure S1. TEM images illustrating polycrystalline structure of the nanowire.

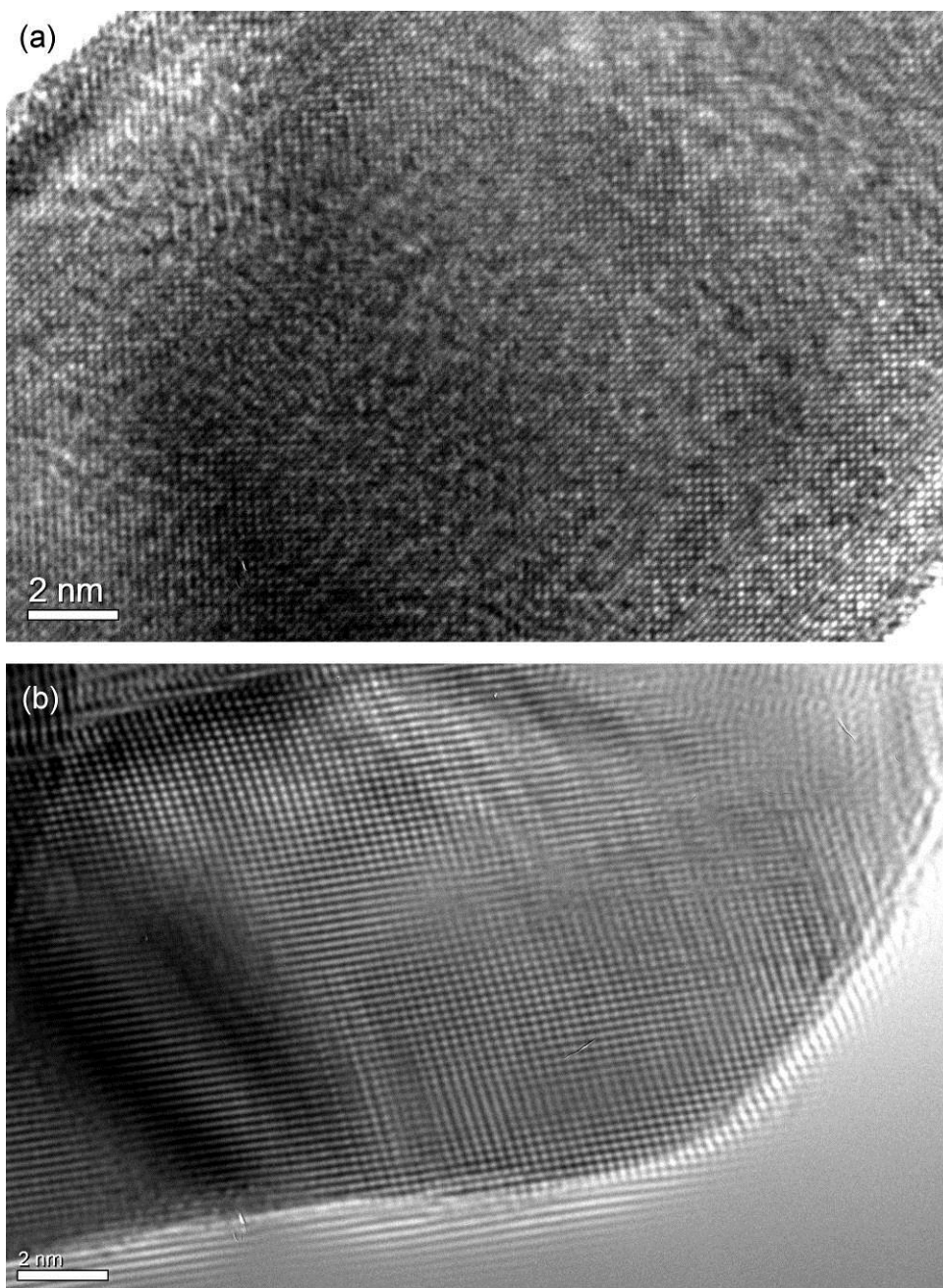


Figure S2. TEM images illustrating polycrystalline structure of the nanowire.

2. The controllability of the Process for the Density and Length of Nanowires

To demonstrate the controllability of the process for the density and length of nanowires, we have conducted an experiment by varying the treatment duration. After 30 min of the sonication, only single nanowires were synthesized. After 60 min of the sonication, the density and length of nanowires was significantly increased. Finally, 120 min of the treatment resulted in the formation of the dense pattern of nanowires with the length reaching several μm

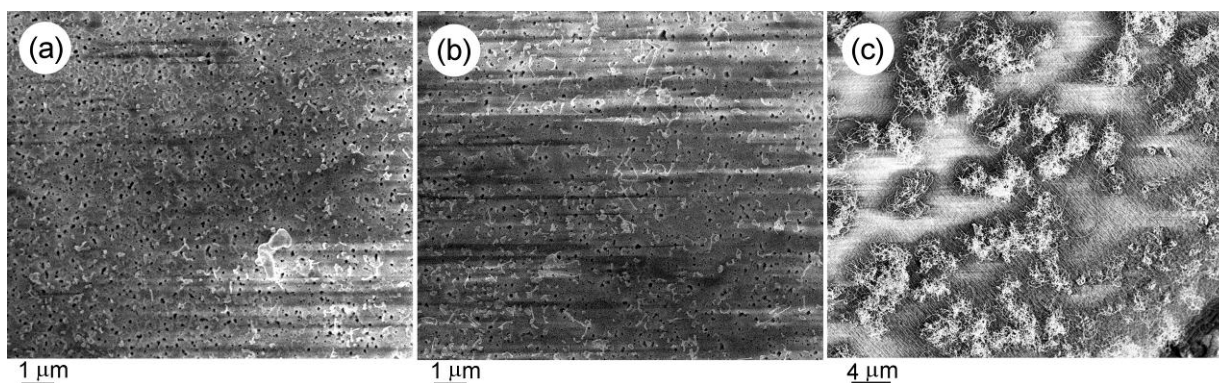


Figure S3. SEM images of the bottom of AAO treated for 30 min (a), 60 min (b), and 120 min (c).

3. Control of the diameters of channel opening (nozzles) by the process duration.

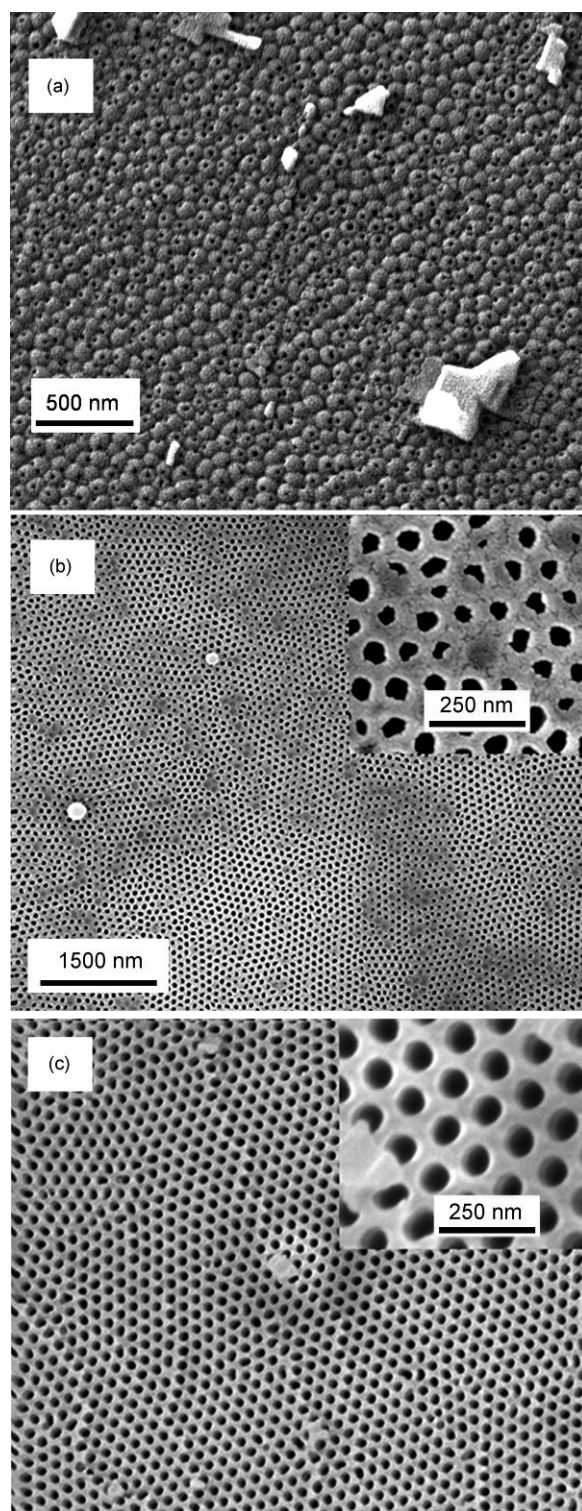


Figure S4. SEM image of AAO bottom after etching in $\text{H}_2\text{Cr}_2\text{O}_4$ for 60 min (a, nozzle diameter of about 20 nm) and in H_3PO_4 for 60 min (b) and 90 min (c), respectively. Insets show high resolution SEM images.

4. Roundish nanoparticles on the bottom side of the template.

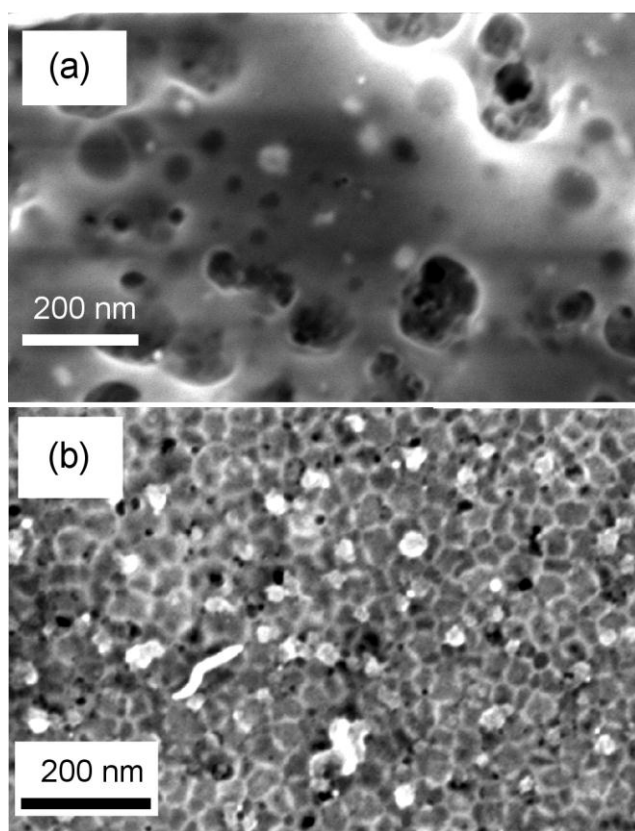


Figure S5. SEM images of gold nanoparticles on the bottom of AAO template.

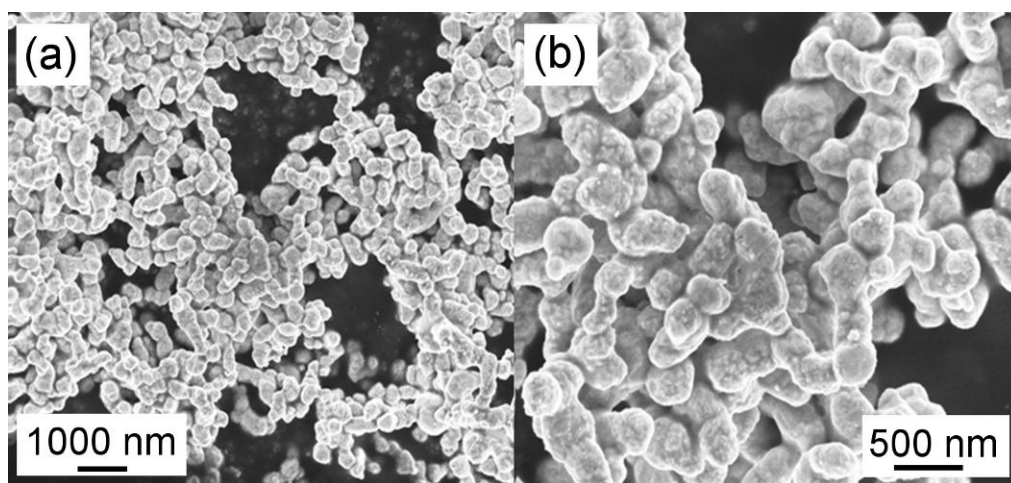


Figure S6. SEM images of gold nanoparticles nucleated in the solution during sonocation.

5. Schematics of the ‘nozzle’ formation at the bottom of template.

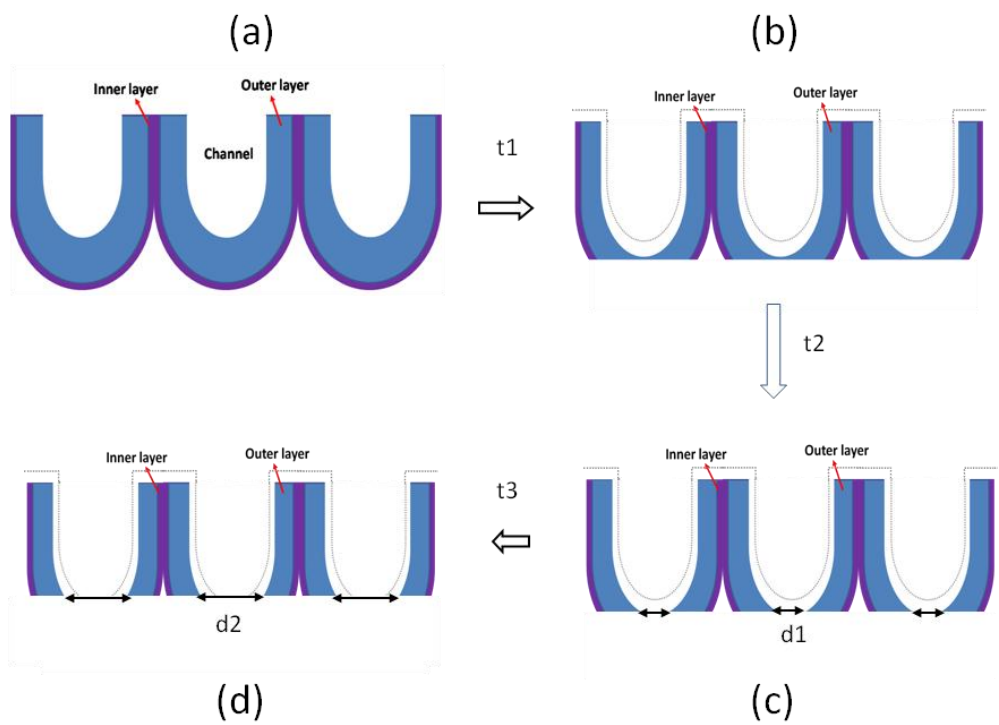


Figure S7. Schematics of the ‘nozzle’ formation at the bottom of template.