

## **Supplementary Material for**

# **Thermal Evaporation Synthesis of Vertically Aligned Zn<sub>2</sub>SnO<sub>4</sub>/ZnO Radial Heterostructured Nanowire Arrays**

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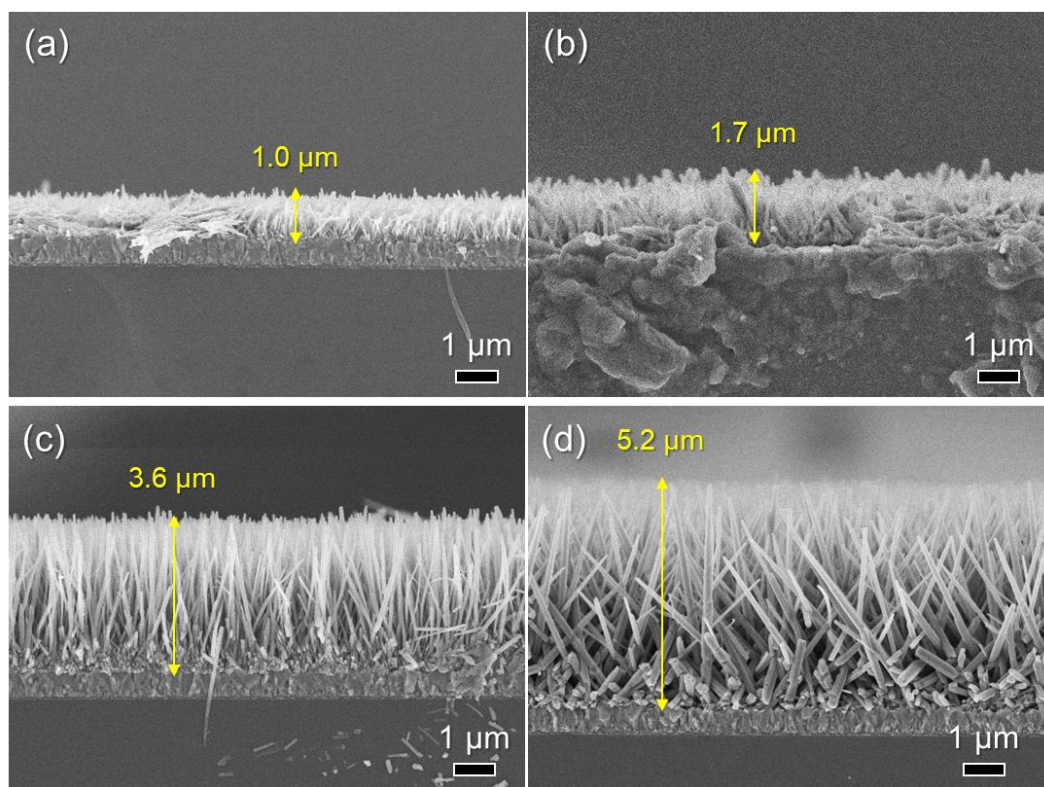
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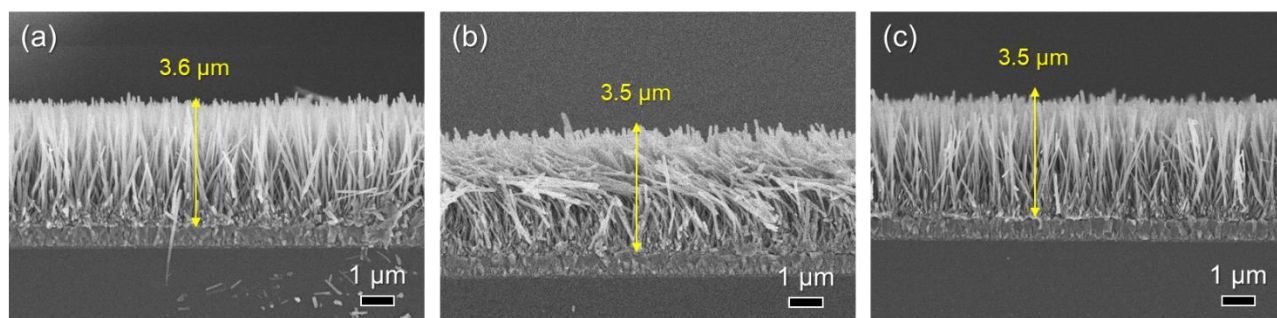
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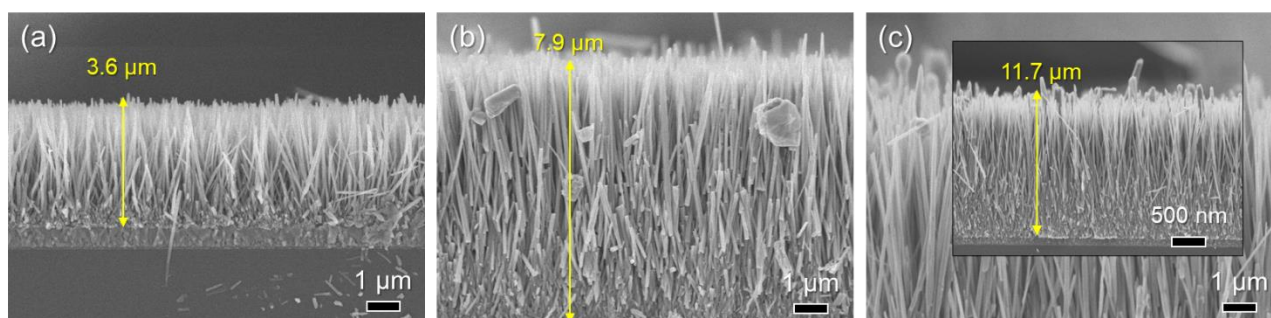
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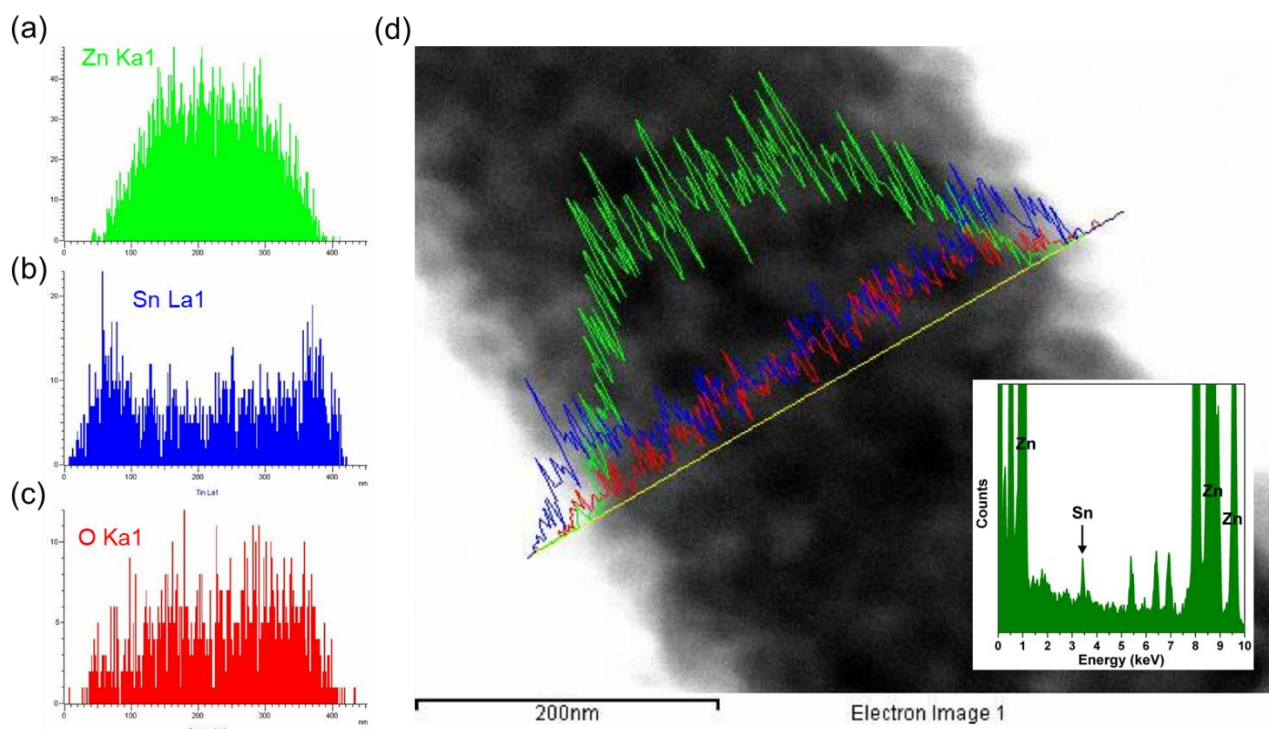
**Figure S1. Effect of  $\text{NH}_4\text{OH}$  amount on the morphology and length of ZnO NWs synthesized at 100 °C/2h with polyethyleneimine (PEI, 1 g) and addition of  $\text{NH}_4\text{OH}$  (a) 1 ml, (b) 2 ml, (c) 3 ml, and (d) 4 ml.**



**Figure S2. Effect of growth time on the morphology and length of ZnO NWs synthesized at 100 °C with polyethyleneimine (PEI, 1 g) and addition of  $\text{NH}_4\text{OH}$  (3 ml). (a) 2 h. (b) 4 h. (c) 6 h. The growth time has little impact on the morphology and length of ZnO NWs.**

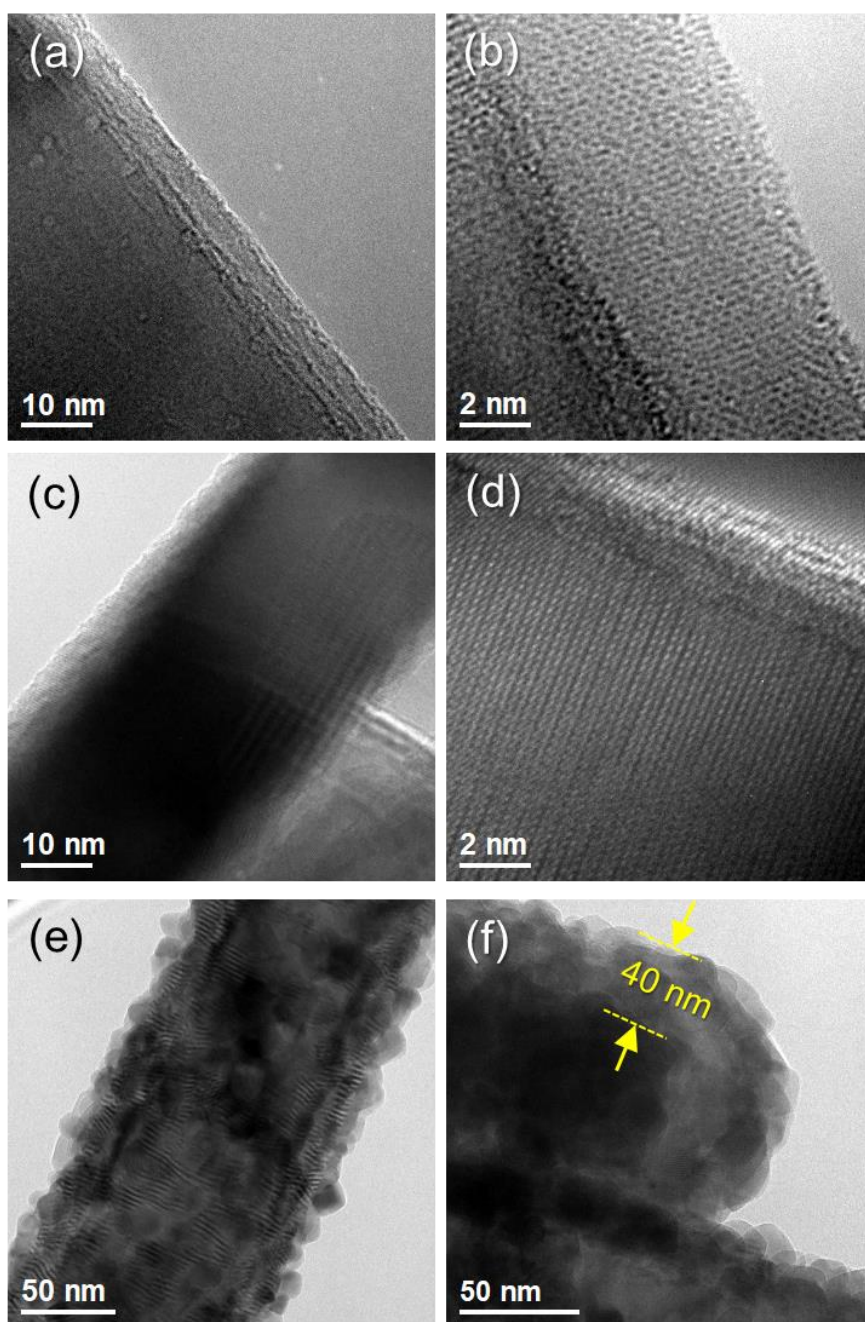


**Figure S3. Effect of growth cycle on the morphology and length of ZnO NWs synthesized at 100 °C/2 h with polyethyleneimine (PEI, 1 g) and addition of NH<sub>4</sub>OH (3 ml). (a) 1 cycle. (b) 3 cycles. (c) 5 cycles.**

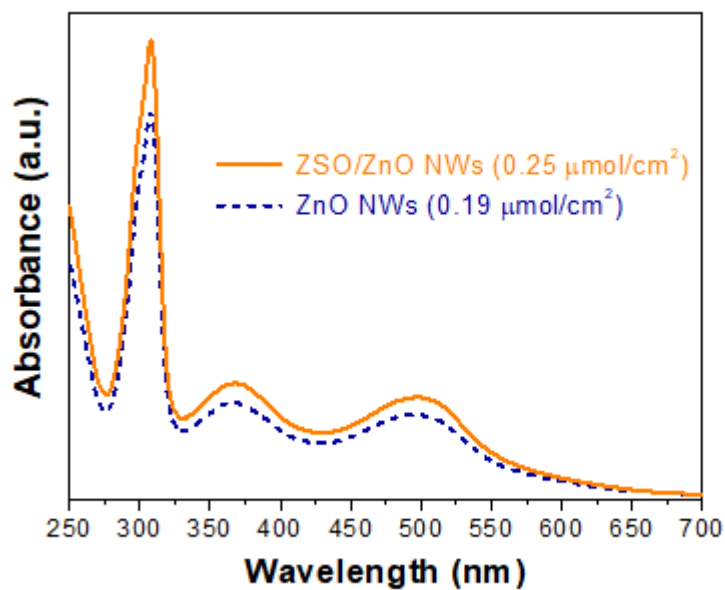


**Figure S4. TEM-EDS analysis of ZSO/ZnO NW.** (a-c) EDS line scan spectra. (d) STEM image. Inset shows EDS spectrum.





**Figure S5. TEM and HR-TEM images of ZSO/ZnO NWs.** (a,b) Zn/Sn evaporation for 30 min, without post-annealing. (c,d) Zn/Sn evaporation for 30 min, with a post-annealing at 550 °C/1h. (e,f) Zn/Sn evaporation for 2 h, with a post-annealing at 550°C/1h.



**Figure S6.** Amount of dye adsorption (N719) measurement by UV-Vis spectroscopy. The ZSO/ZnO HNA exhibited 130% larger dye adsorption, indicating a larger surface (or surface roughness) area than the ZnO NW.