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MDPI

Supplementary Materials

Enhanced Photocatalytic Activity and Photoluminescence of ZnO Nano-Wires Coupled with Aluminum Nanostructures

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S1 Seed layers

Some previews work reported that the ZnO seed layers consisted of sequential layers deposited by repeating the dip coating or spin coating process for several cycles, over than 5 times, to synthesize then the nanowires in a chemical bath [1–3]. To study its morphological aspect, the ZnO seed layers were observed with a scanning electronic microscope (SEM). For this purpose, samples were prepared in sequential layers of one cycle (Figure S1-A), three cycles (Figure S1-B) and five cycles (Figure S1-C). The sample deposited on a sequence of 5 cycles has the highest ridge and then the height of ridges decreases by reducing the number of cycles (Figure S1-A-B and C). The Figure S1-D shows a zoom-in a ridge and it is seen in the figure S1-E that nanowires follow ridge orientation. However, we notice that for only one iteration (Figure S1-C) the surface of the layer becomes flat, homogeneous and the ridges disappears as seen in the zoom (Figure S1-F).

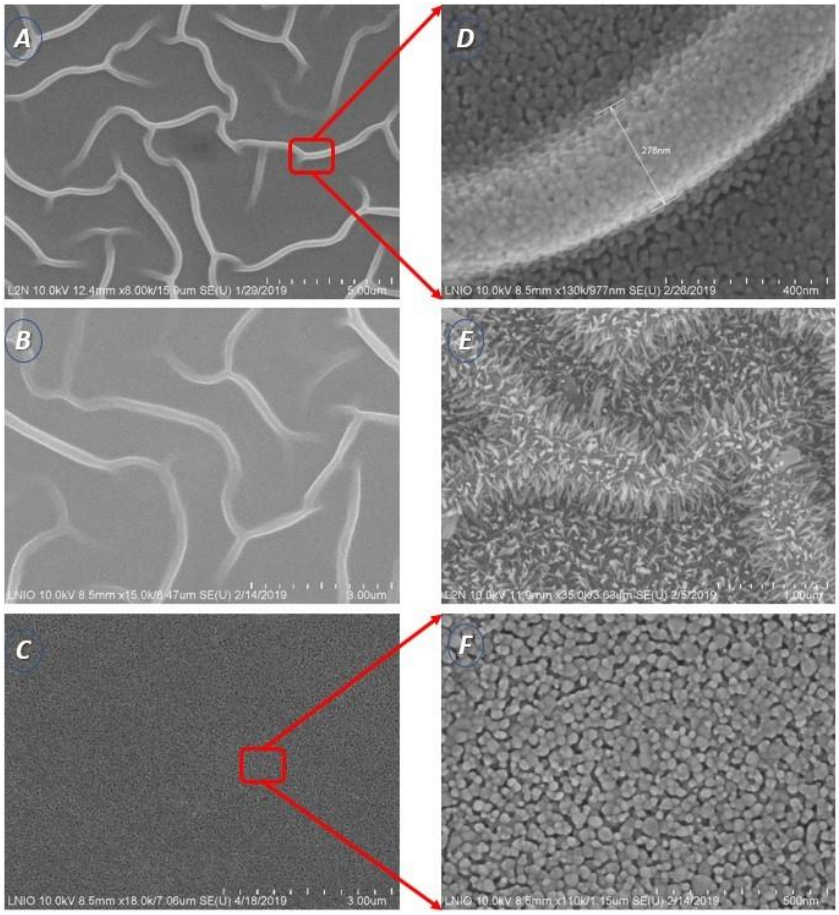

Figure S1. SEM images for the ZnO seed layers with different cycle of deposition procedure. (A) ZnO seed layers deposited in 5 cycles; (B) ZnO seed layers deposited in 3 cycles; (C) ZnO seed layer deposited in 1 cycle; (D) Zoom on a ridge; (E) ZnONWs grown on seed deposited in 5 cycles; (F) Zoom on a seed layer deposited in 1 cycle.

S2 Tauc plot

The energy band gap value could be calculated from the obtained UV-Visible absorption data using the Tauc formula given by [4, 5]:

$$(\alpha h\nu)^2 = \left(\mathrm{h}\nu - E_g\right) \quad (1)$$

Where α is the absorption coefficient, h is the Planck constant, ν is the frequency and E_g is the band gap energy.

Figure S2 presents the result of $(\alpha h\nu)$ versus energy (eV) for ZnONWs and ZnONWs decorated by AlNSs. The band gap energy (E_g) value is the intersection point between the tangent to the linear part of the curve and the energy axis.

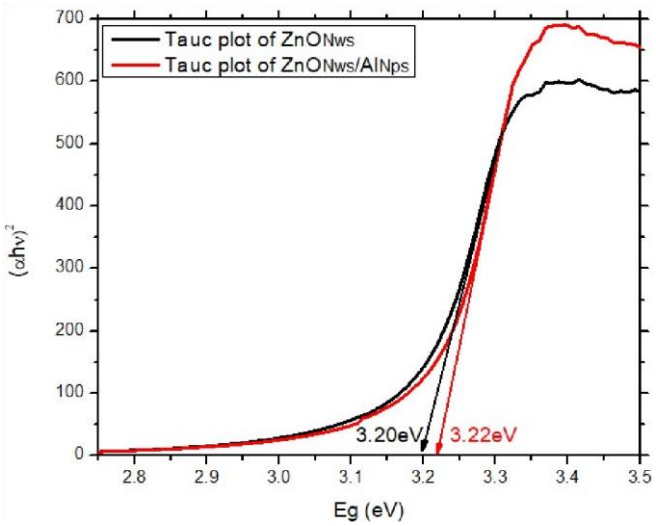

Figure S2. Tauc plot of ZnONws and ZnONws/AlNSs.

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