Supplementary Materials

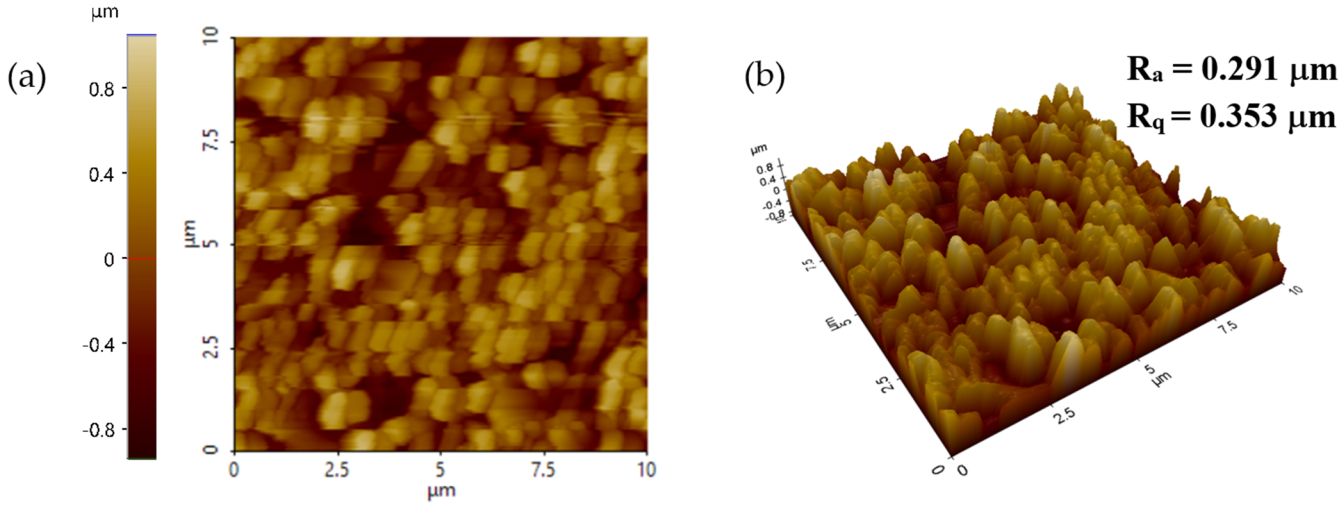


Figure S1. Surface topography of sample S2 (ZnO nanorods grown without a seed layer) characterized by atomic force microscopy (AFM): (a) 2D and (b) 3D surface images.

Description:

Figure S1 illustrates the surface topography of sample S2. The average roughness (R_a) and root-mean-square roughness (R_q) were determined via AFM analysis to be 0.291 µm and 0.353 µm, respectively. To evaluate the roughness factor (R) reported in Table 2 of the main manuscript, Gwyddion software version 2.64 was employed to calculate the actual surface area over a projected area of 100 µm² (10 × 10 µm²). The calculated actual surface area was 257.73 µm², yielding an R value of 2.58. In contrast to the dense, vertically aligned nanorods in S3, the larger inter-rod spacing in S2 enabled the AFM probe to sufficiently penetrate the surface, thereby providing a representative estimation of the surface topography.