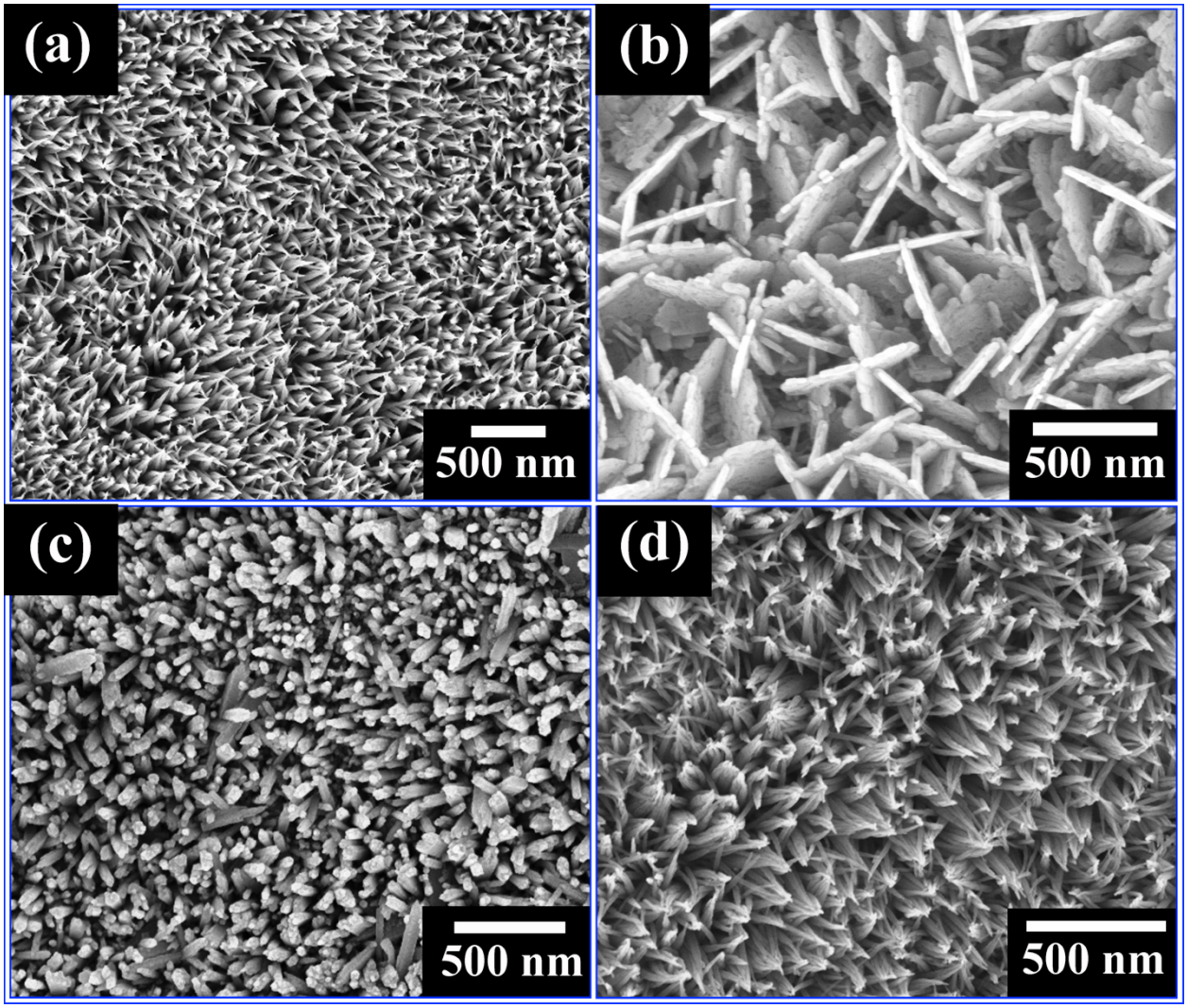
**SUPPORTING INFORMATION:**

**Characterizations:**

The artifact morphology was examined using field emission scanning electron microscope (FESEM, Hitachi S-4800). The crystallinity and phase of the synthesized nanostructures were characterized by X-ray diffraction (XRD, D8 Advanced Bruker) and high resolution transmission electron microscopy (HRTEM, JEOL JEM-2100). Investigation of phase purity and surface composition of the samples were examined by X-ray photoelectron spectroscopy (XPS) using a SPECS HSA-3500 hemispherical analyzer with a monochromatic Al Kα X-ray source. Room temperature photoluminescence (PL) spectra were recorded with a Spectrofluorometer (ELICO, SL174). FE measurements were performed in a high vacuum system at $2*10^{-6}$ mbar by using conventional parallel-plate configuration where the sample on zinc foil serving as the cathode and a conically shaped stainless steel electrode (tip diameter~1.5-mm diameter) as the anode. For electrical measurement special technique was carried out (figure 8a). The electrical current was recorded by a programmable electrometer (Model 6517A, KEITHLEY, USA) and a xenon lamp (300 W; Spectral Energy, USA) was used as the light source for the photoconductivity experiment and a monochromator (Type-H20 UV, Instruments S.A., Jobin-Yvon, France) as photo-excitation wavelength selector.




**FigureS1:** Low magnification images for (a) nanospike, (b) nanosheet, (c) nanorod and (d) nanowire.

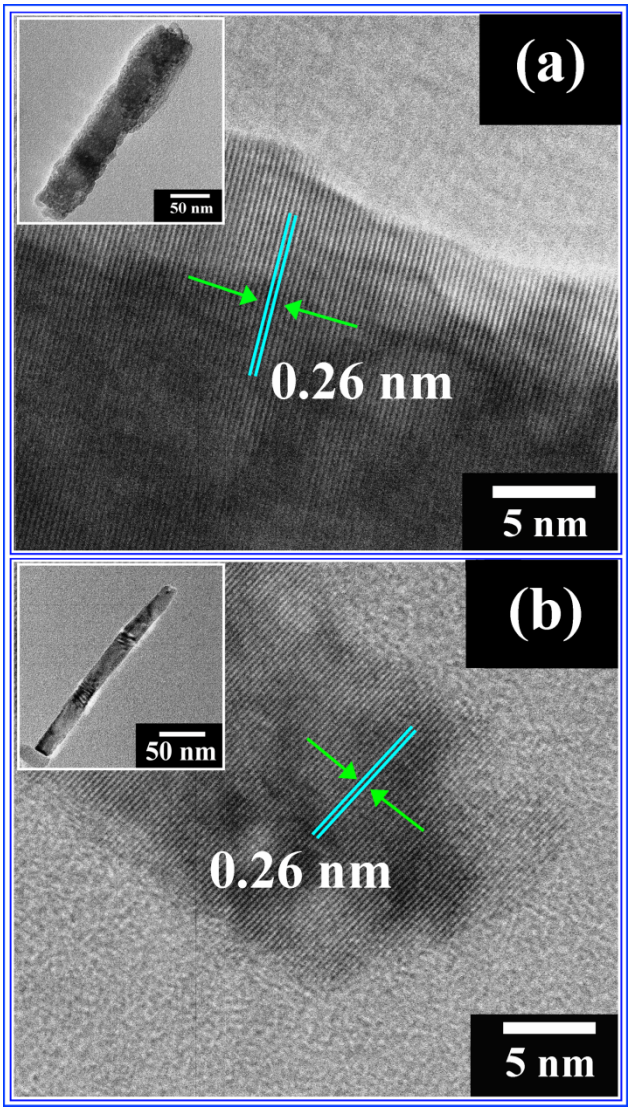



**Figure S2:** HRTEM images of the (A) nanorod (B) nanowire; inset show corresponding TEM images.

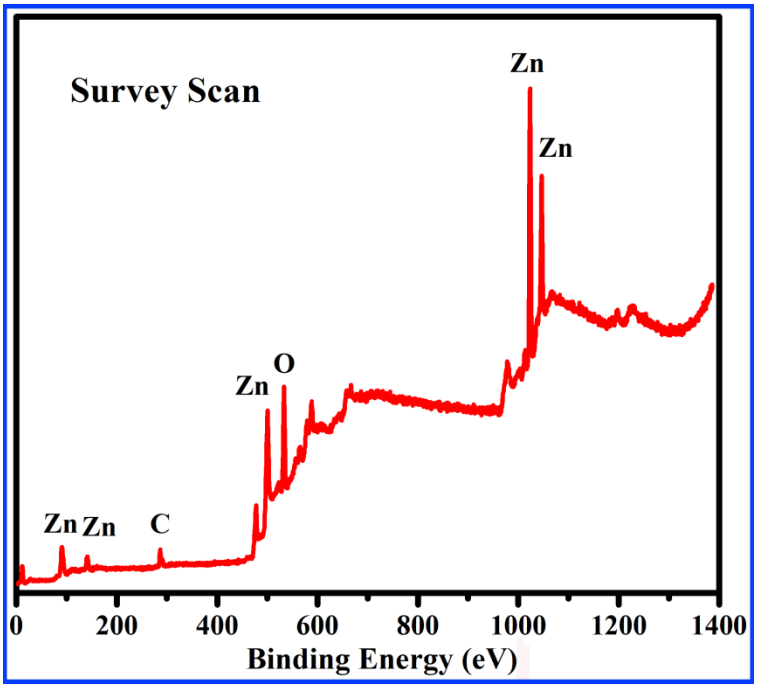



**Figure S3:** (a) XPS survey scan of nanospike.

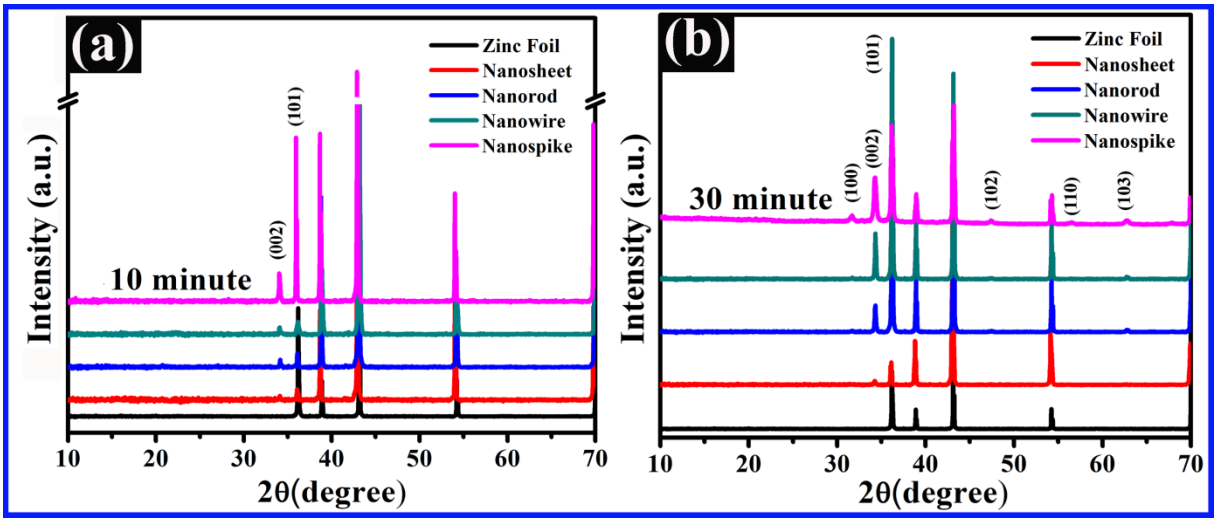



**Figure S4:** XRD patterns of the intermediate samples and zinc foil (a) 10 minutes (b) 30 minutes.

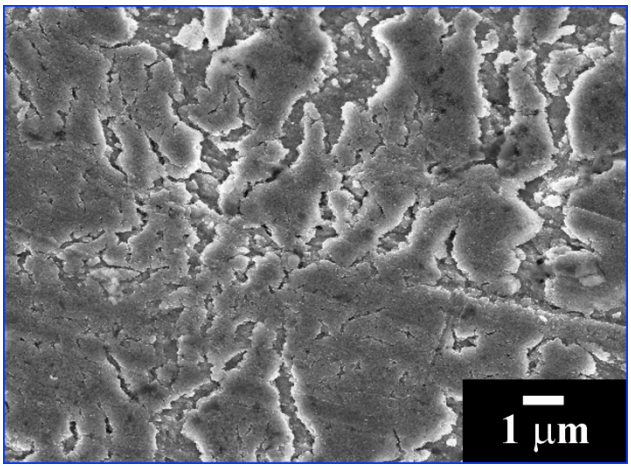



**Figure S5:** Zinc foil only in KOH solution