Electronic Supplementary Information (ESI)

Hierarchical zinc oxide nano-tips and micro-rod: Hydrothermal synthesis and improved chemi-resistive response towards ethanol

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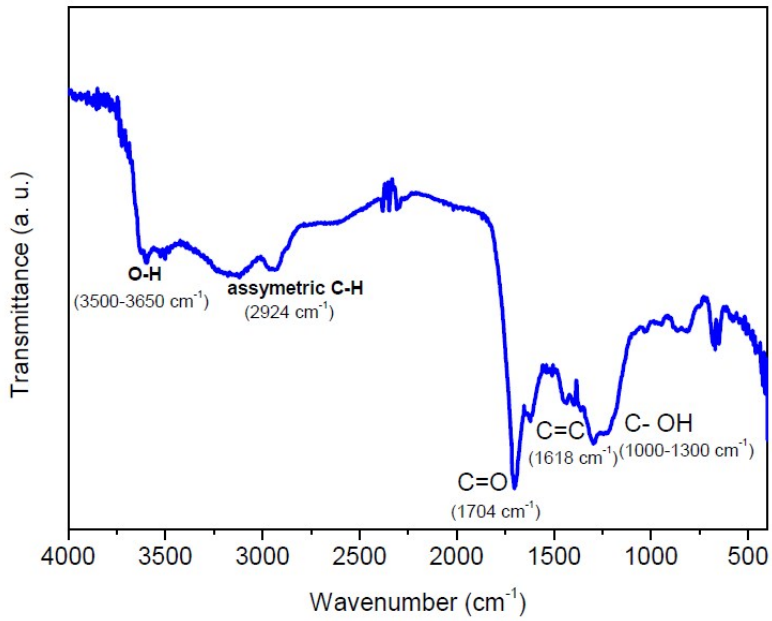
FTIR 

Figure S1: spectrum of hydrothermally prepared spherical carbon template

Description: The formation of the carbon spheres involves the dehydration and subsequent carbonization of dextrose. Due to non- or just partially dehydrated dextrose, the surface of the spheres contains OH and C=O groups.[1] As shown in the Figure, the broad band at 3500-3650 cm^{-1} is attributed to O-H (hydroxyl) vibration. The band at 2924 cm^{-1} is due to asymmetric C-H stretching of aliphatic groups. C–OH stretching and bendinng vibration are observed at 1000-1300 cm^{-1}. The bands at 1,704 and 1,618 cm^{-1} are attributed to C=O vibration and in-plane C=C stretching vibration of aromatic ring respectively.[1-2]

1. X. Sun, Y. Li, Colloidal carbon spheres and their core/shell structures with noble-metal nanoparticles, Angew. Chem. Int. Ed. 43 (2004) 597-601.

2. Y. Z. Jin, C. Gao, W. K. Hsu, Y. Zhu, A. Huczko, M. Bystrzejewski, M. Roe, C. Y. Lee, S. Acquah, H. Kroto, David R.M. Walton, Large-scale synthesis and characterization of carbon spheres prepared by direct pyrolysis of hydrocarbons, Carbon 43 (2005) 1944-1953.

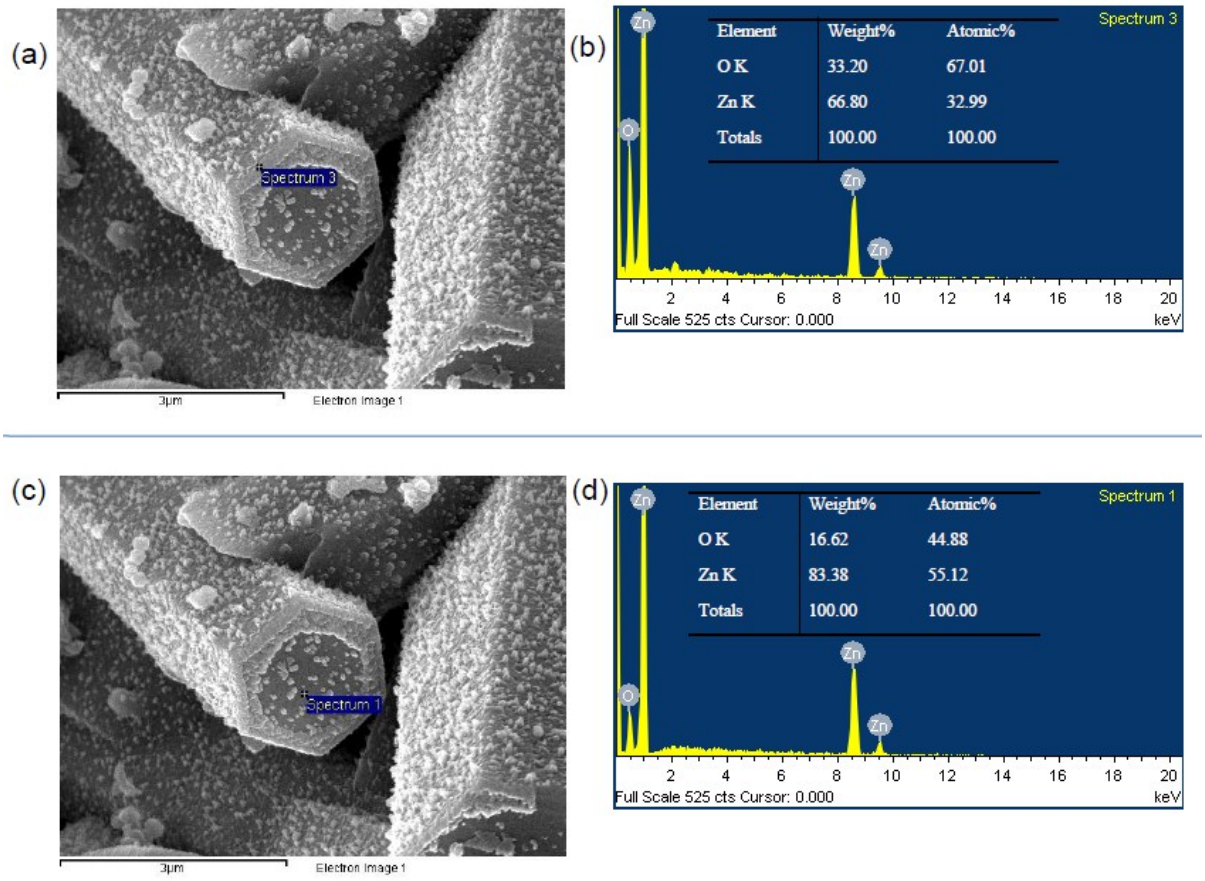


Figure S2: (a) Point scanning on ZnO nano-tips and (b) corresponding EDS spectrum; inset table summarizes the weight and atomic % of Zn and O obtained from EDS spectrum of ZnO nano-tips (c) Point scanning on ZnO micro-rod and (d) corresponding EDS spectrum; inset table summarizes the weight and atomic % of Zn and O obtained from EDS spectrum of ZnO micro-rod.

Description: The compositions of the nano-tips as well as micro-rod are separately studied using the energy dispersive X-ray spectroscopy (EDS) facility associated with the FESEM instrument. Compositional analyses using point scanning mode exhibit that the zinc (Zn) and oxygen (O) ratio is higher for micro-rod than nano-tips which further supports that the crystallinity of the micro-rod is better than the nano-tips.

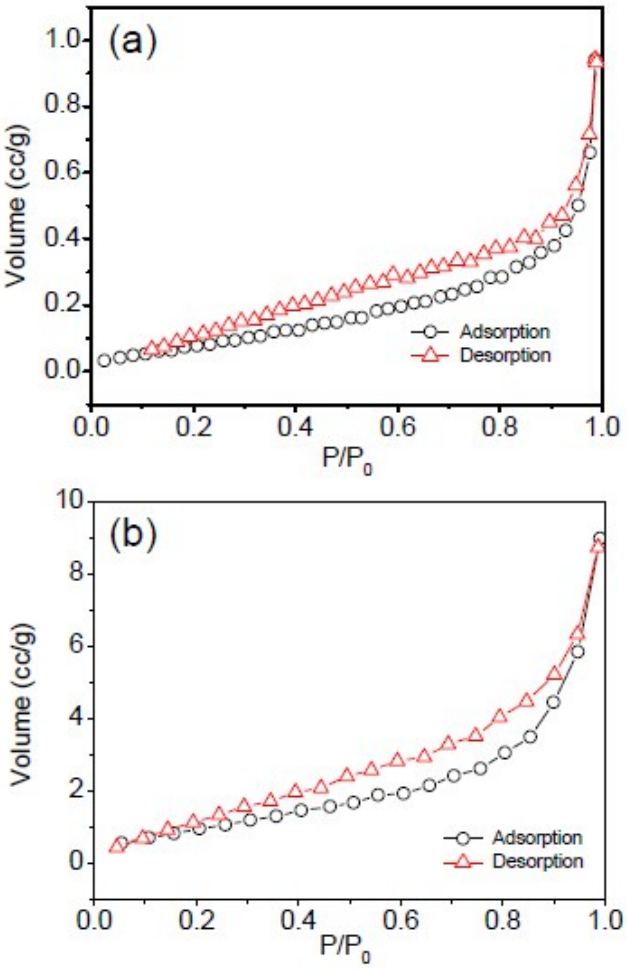


Figure S3: N_2 adsorption-desorption isotherms of (a) A-I and (b) A-II derived ZnO products

Description: The surface area of the products derived from A-I and A-II are estimated from the N_2 adsorption-desorption isotherm shown in the figure. The estimated surface area of product derived from A-II (7.2 $m^2 g^{-1}$) is found considerably higher than the product derived from A-I (3.9 $m^2 g^{-1}$).

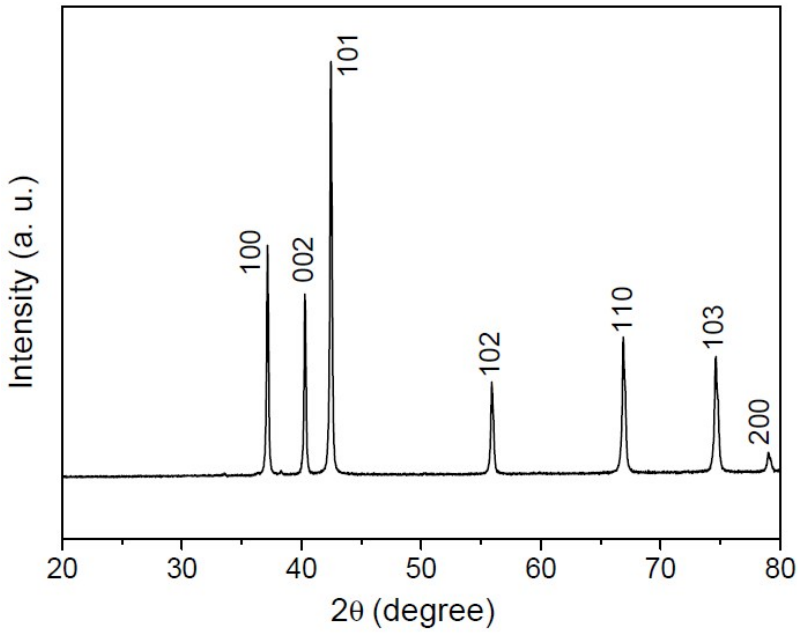


Figure S4: XRD pattern of prepared hierarchical ZnO

Description: Figure S4 represents the X-ray diffraction pattern of ZnO hierarchical structure. The XRD pattern is in good agreement with the JCPDS Card No. 03-0888. The XRD pattern recorded under CoKa radiation (PW 3040/60, Panalytical, Netherland).