## **3D ITO-nanowire networks as transparent electrode** for all-terrain substrate

Qiang Li<sup>1,2,3</sup>, Zhenhuan Tian<sup>2</sup>, Yuantao Zhang<sup>2</sup>, Zuming Wang<sup>2</sup>, Yufeng Li<sup>2</sup>, Wen Ding<sup>2</sup>, Tao Wang<sup>3</sup>, and Feng Yun<sup>1,2</sup>\*

<sup>1</sup>Key Laboratory of Physical Electronics and Devices for Ministry of Education and Shaanxi Provincial Key Laboratory of Photonics & Information Technology, Xi'an Jiaotong University, Xi'an, Shaanxi, 710049, P. R. China

<sup>2</sup>School of Electronic and Information Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi, 710049, P. R. China

<sup>3</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Mappin Street, Sheffield, S1 3JD, UK

## **Supplementary 1**



Figure S1|The transmittance of ITO-nanowire networks in the wavelength of 300-1200 nm.

## **Supplementary 2**



Figure S2|The 3D ITO nanowire network was grown on the surface of the pyramid array. a, The connection between the edge of pyramid and the substrate. b, The connection between the corner of pyramid and the substrate.

## **Supplementary 3**



**Figure S3**|**The growth schematic diagrams and SEM images of ITO nanowires via PS spheres and physical vapour deposition. a**, In our method via PS,step1: ITO molecules were adsorbed by the molten PS; step 2: some molecules were adsorbed directly on the surface of In-Sn alloy; step 3: the ITO nanowires began to grow from bottom to up. From the SEM image, the ITO nanowires are interwoven into a dense network and there are no spherical particles at the top of the nanowires. **b**, In the method of physical vapour deposition, step1: ITO molecules were adsorbed directly by In-Sn alloy; step 2:the ITO nanowires began to grow from up to bottom. From the SEM image (Nanotechnology 23, 105608, 2012), the top of the nanowires has obvious spherical particles.