Supplementary Material (ESI) for Chemical Communications

Supplementary Information

UV-Manipulated Wettability between Superhydrophobicity and Superhydrophilicity on Transparent and Conductive SnO_2 Nanorod Film

Weiqin Zhu,[a, b] Xinjian Feng,[a, b] Lin Feng [c] and Lei Jiang*[a, d]

[a] *Center for Molecular Sciences, institute of Chemistry, Chinese Academy of Science, Beijing 100080,P. R. China. Fax: (+86) 10 8262 7566; Tel: (+86) 10 8262 1396; E-mail:jianglei@iccas.ac.cn*

[b] *Graduate School of Chinese Academy of Science, Beijing 100080, P. R. China.*

[c] *Department of Chemistry, Tsinghua University, Beijing 100084, P. R. China.*

[d] *National Center for Nanoscience and Nanotechnology, Beijing 100080, P. R. China.*

Instruments employed for characterizations

The surface morphology of the film was characterized by FE-SEM (JSM-6700F). The fine structure of the nanorods was characterized by HRTEM (H-9000 NAR). The crystallographic phase of the nanorods was characterized by XRD (Rigaku D/max 2500 using Cu $_{K\alpha}$ radiation). Water contact angles were measured with OCA20 (Dataphysics) at room temperature. The conductivity of the films was examined with conducting AFM using a Seiko SPI-3800N scanning probe microscope. The transmitting spectra of the films were measured by U-3010 spectrophotometer. The XPS analysis was performed on a VG Scientific ESCALab220i-XL spectrometer.

XPS analysis

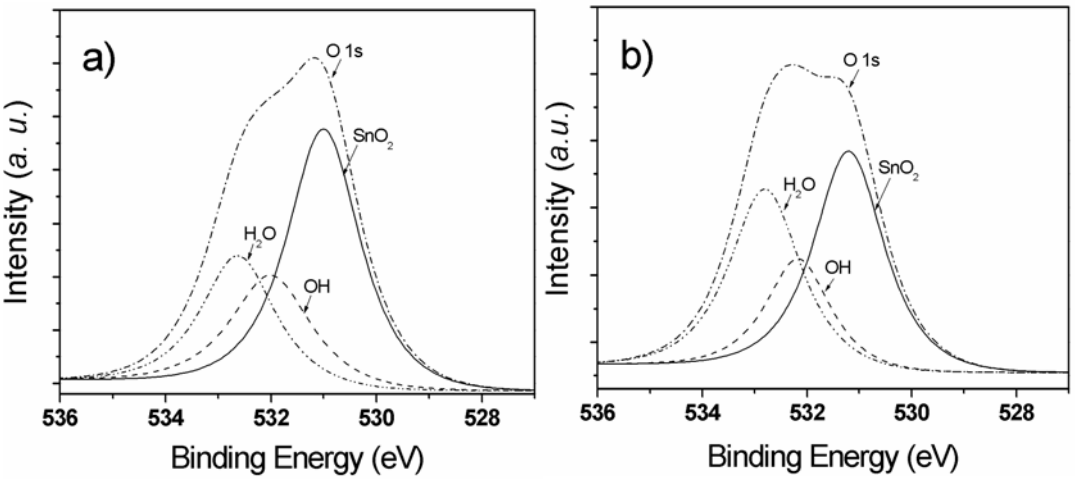

Figure S1 O 1s spectra of the SnO_2 nanorod film a) before and b) after UV irradiation

Figure S1 a) and b) are the O 1s spectra of the as-prepared SnO_2 nanorod film before and after UV-irradiation, respectively. The broad shoulder at the higher binding energy side of the main O 1s peak of the SnO_2 films can be fitted with two peaks. For these two peaks, the one at higher binding energy side corresponds to the physically adsorbed water molecule (H_2O), the other at lower binding energy side corresponds to the dissociatively adsorbed water molecule (OH). Comparing these two spectra, it can be found that the shoulder increased remarkably after UV-irradiation, which is caused by the increasing of the intensities of the two fitted peaks. This indicates that the adsorption of water molecules on the SnO_2 surface is enhanced by UV-irradiation, which induces a highly hydrophilic SnO_2 surface.

Details for conductive property measurement

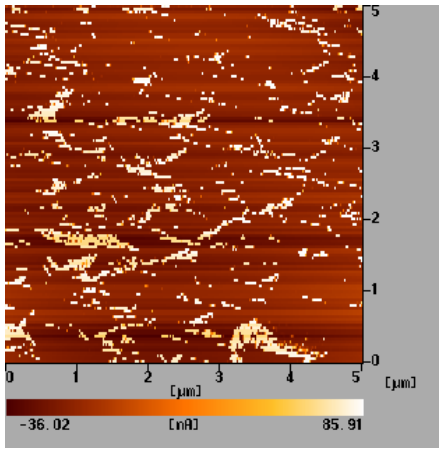

Figure S2. simultaneous current scanning image of the SnO_2 nanorod films

For the investigation of conductive property with conducting AFM, the films were deposited on FTO glass and the sample was fixed on a metal plate with conductive gel to ensure an ohmic electrical electrical contact between the sample and the sample stage on a piezo scanner. The simultaneous current scanning image of the SnO_2 nanorod films at a bias voltage of 2V is shown in Figure S2. The bright areas in the current image imply a high conductivity. The *I-V* curve shown in Fig. 5a represents the typical *I-V* behavior of the bright sites in the current scanning image.