

# Construction of High-quality SnO<sub>2</sub>@MoS<sub>2</sub> Nanohybrids for Promising Photoelectrocatalytic Applications

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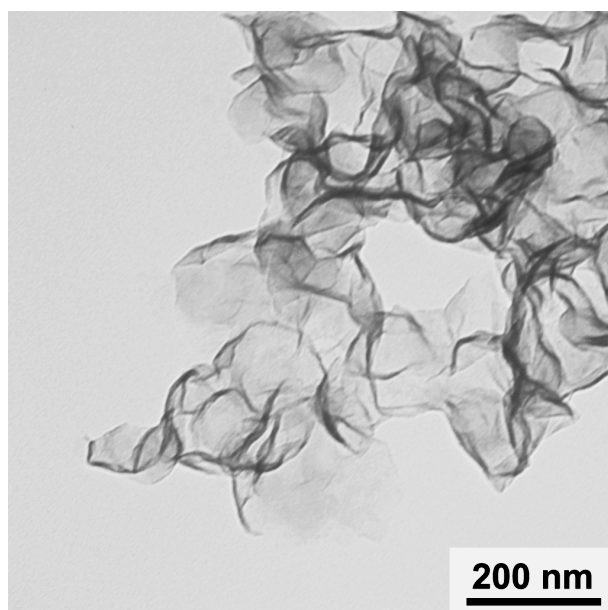
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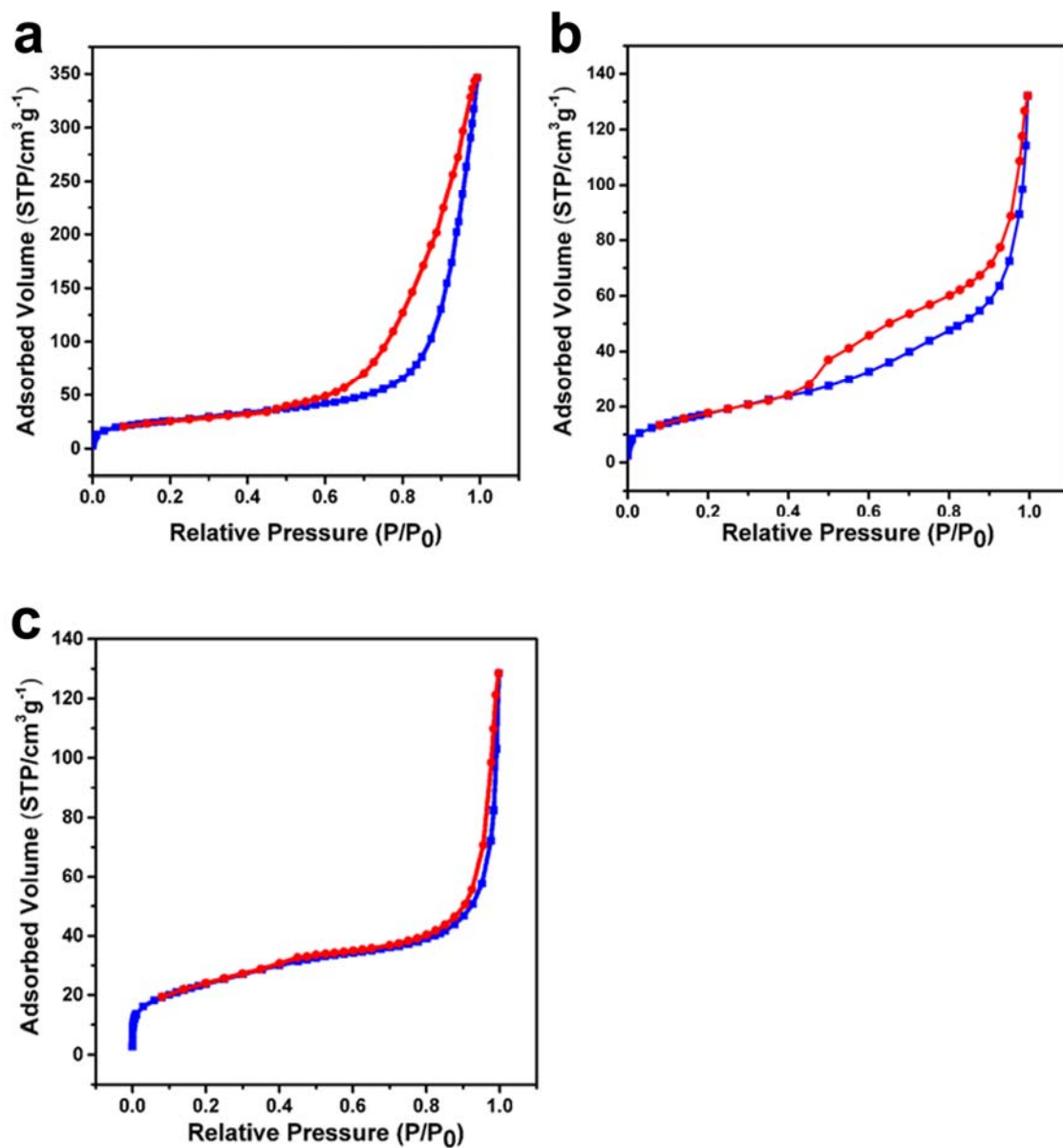
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## Characterizations

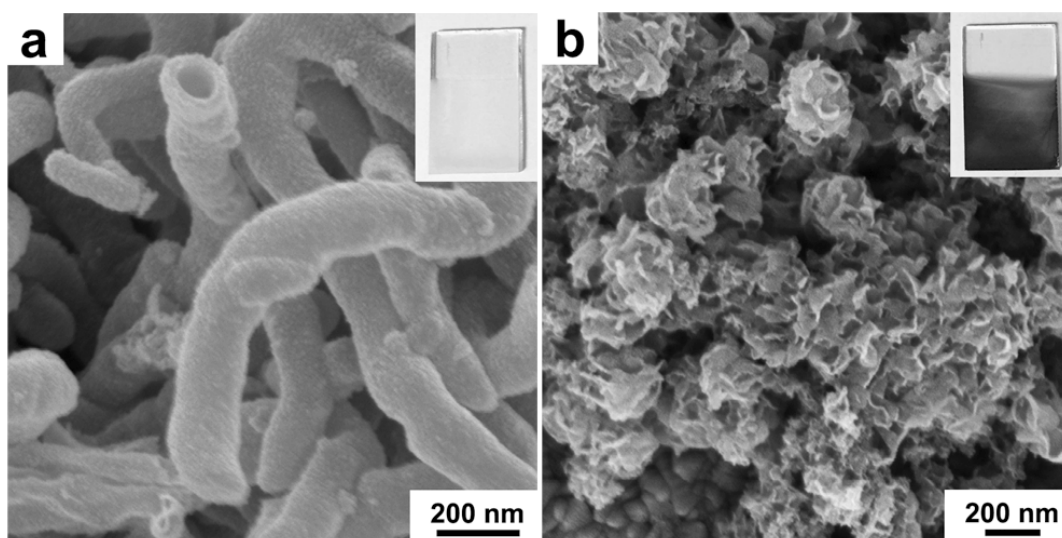
Powder X-ray diffraction (PXRD) patterns of the samples were recorded using a Rigaku D/MAX-RB (Japan) with monochromatized Cu K $\alpha$  radiation ( $\lambda=1.5418$  Å) in the  $2\theta$  ranging from  $5^\circ$  to  $80^\circ$ . Scanning electron microscopy (SEM) analysis of the samples was measured with Carl Zeiss Sigma (Germanic) operating at 20 kV. Transmission electron microscope (TEM) and high-resolution transmission electron microscopy (HRTEM) analyses of the samples were obtained with JEOL JEM-2100 (Japan) transmission electron microscope operating at 200 kV. High-angle annular dark field-scanning transmission electron microscopy (HAADF-STEM) was performed with FeiTecnat G2F20S-Twin (USA) operating at 200 kV equipped with energy dispersive X-ray spectroscopy (EDX) mapping. Nitrogen adsorption-desorption isotherms of samples were recorded from Micrometrics TriStar 3000 porosimeter at 77 K. The specific surface areas were calculated based on the Brunauer-Emmett-Teller (BET) method. X-ray photoelectron spectroscopy (XPS) was conducted using Escalab 250 xi photoelectron spectrometer using Al K radiation (15 kV, 225 W, base pressure  $\approx 5 \times 10^{-10}$  Torr). Ultraviolet-Vis (UV-vis) absorption spectra were measured by JASCO V-570 UV/Vis/NIR spectrometer.



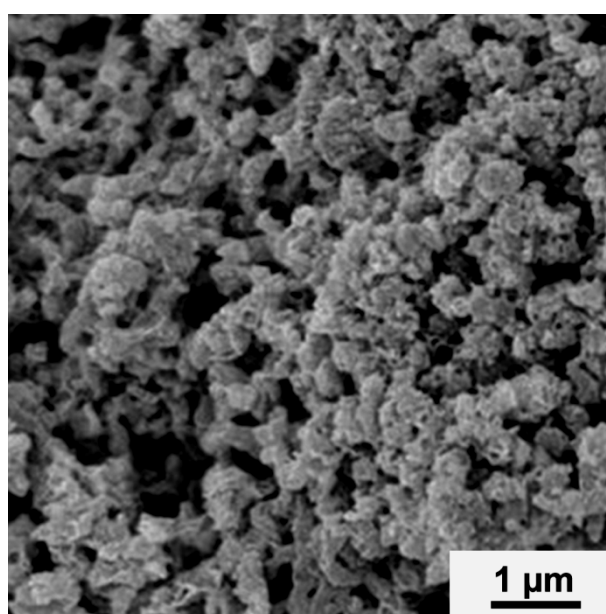
**Figure S1.** TEM image of MoS<sub>2</sub> nanoflakes.



**Figure S2.** Nitrogen adsorption-desorption isotherm for (a) SnO<sub>2</sub>@MoS<sub>2</sub> nanohybrids; (b) pure MoS<sub>2</sub> nanoflakes; and (c) pure SnO<sub>2</sub> nanotubes.



**Figure S3.** SEM images of (a) SnO<sub>2</sub> film and (b) MoS<sub>2</sub> film.



**Figure S4.** SEM image of SnO<sub>2</sub>@MoS<sub>2</sub> hybrid film after PEC degradation.