Electronic Supplementary Information

Aqueous Solution Synthesis of SnO Nanostructures with Tuned Optical Absorption and Photoelectrochemical Properties through Morphological Evolution

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FT-IR and TG analysis of organic residue on the SnO nanostructures

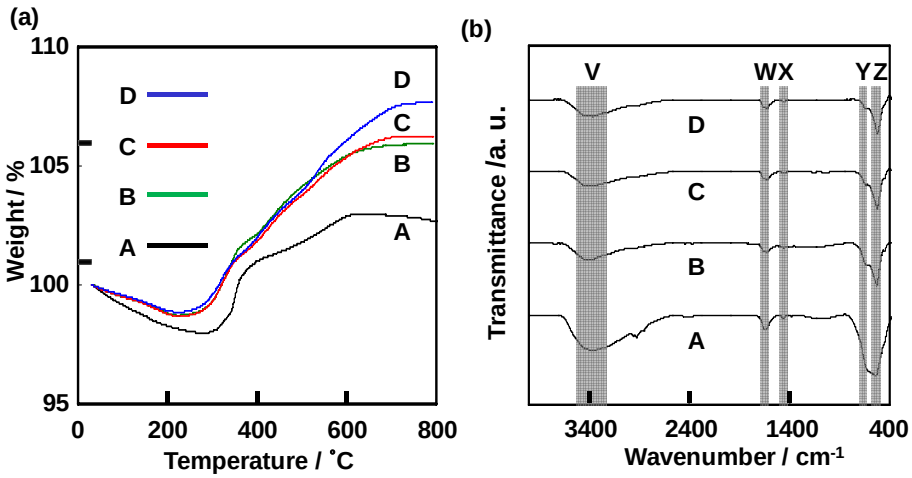

Figure S1. TG curves (a) and FT-IR spectra (b) of the SnO nanostructures including sheets (A), ribbons (B), and their composite structures (C,D).

The TG analyses were performed in air. Thus, the oxidation from SnO to SnO_2 proceeds in air. In the TG curves, the weight losses up to 300 °C was caused by the residual water molecule and the weight increase around 400 °C results from the oxidation of SnO to SnO_2. Based on the calculation, the oxidation of SnO leads to ca. 12 wt. % of weight increase to form SnO_2 crystals. In contrast, our samples show the weight increase ca. 5 wt. %. The results indicate that the residual water molecules and organic compounds contain in the resultant SnO nanostructures.

FT-IR spectrum of the SnO nanostructures was measured by KBr method. Each absorption band can be assigned as follows. The absorption bands designated by V and W are assigned to the O–H stretching and bending vibrations of water molecules absorbed on the SnO nanostructures, respectively. The weak absorption band designated by X can be attributed to N–H bending vibration ammonium ions (NH_4^+) or/and symmetric C–O stretching vibration of carbonate ions (CO_3^-). The absorption bands Y and Z can be attributed to stretching vibrations of Sn–O in the SnO nanostructures.[S1] However, we could not definitely identify these peaks to the specific organic components.

Reference

S1. D. Amalric-Popescu and F. Bozon-Verduraz, *Catalysis Today* **70** (2001), 139.

XRD patterns of the pellet consisting of the SnO nanosheets

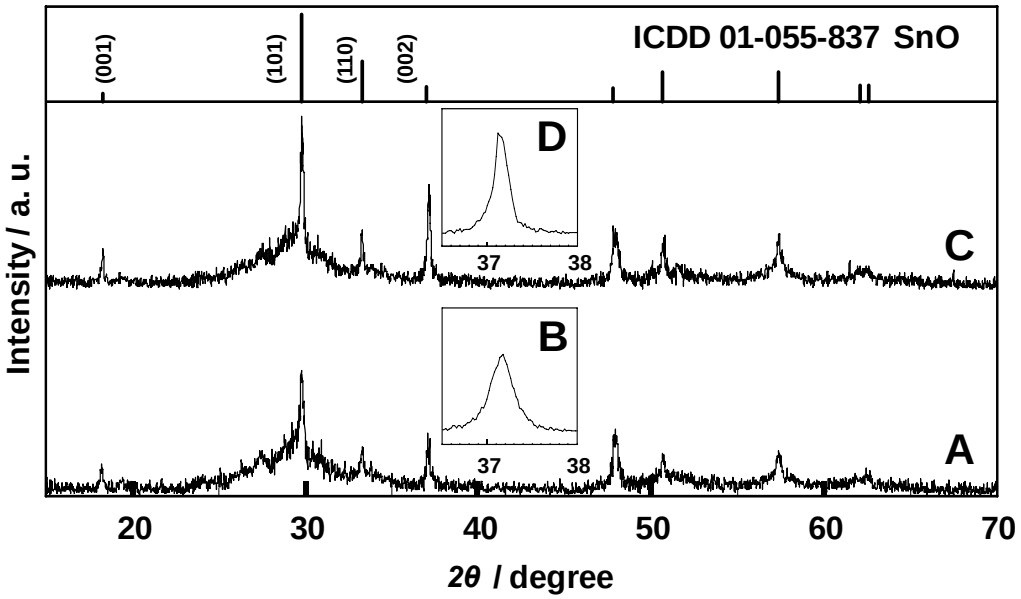

Figure S2. XRD patterns of the pellet consisting of the SnO nanosheets (A, B) and the sintered sample (C, D).

All the XRD patterns of the pellets agree with tetragonal SnO (A, C). The SnO crystals in the pellets were not oxidized after the sintering at 400 °C in argon atmosphere. The sharpened peaks of the (002) planes indicate the grain growth (profiles B and D). The half width of the (002) planes was sharpened from 2θ=0.295 degree to 2θ=0.180 degree with the sintering.