Electronic Supporting Information

One-Step Preparation of Single-Crystalline β -MnO₂ Nanotubes

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S1. XRD patterns of samples obtained at different growth stages of nanotubes

The X-ray powder diffraction (XRD) patterns of the intermediate products prepared with 2 h, 3 h, 5 h and 8 h were shown in Figure S1a- S1d, respectively. The corresponding TEM images of these samples have been shown in Figure 4 in the main text. From these XRD patterns, one can see that the peaks of the initial stages' product can be indexed to monoclinic MnOOH (manganite, JCPDS 41- 1379). While, the XRD pattern of the final product was shown in Figure S1e, namely Figure 1 in the main text, in which no peaks of monoclinic MnOOH be detected. Comparing the XRD patterns in Figure S1b and S1c, it was found that the peaks of monoclinic MnOOH has disappeared, Meanwhile, some new small peaks appeared in the 5 h product. They might come from the newly formed well-crystallized β -MnO₂ nanostructures. When the recrystallization of MnO₂ molecules was completed, the peaks were clearly displayed (Figure S1e).

Figure S1. XRD patterns of samples obtained at different growth stages of nanotubes after hydrothermal treating for: (a) 2 h; (b) 3 h; (c) 5 h; (d) 8 h; (e) 10 h.

S2. The effects of PVP on the β -MnO₂ nanotubes formation

Various amounts of PVP are used to investigate the effect of the capping reagents on the formation of β -MnO₂ nanotubes. The result is shown in Figure S2, where the reaction is performed on the same reaction conditions by the hydrothermal process for 10 h except with different concentration of PVP.

Figure S2. A set of TEM images corresponding to samples obtained with different concentration of PVP (mol/ L): (a) no adding PVP; (b) 0.1 mol /L; (c) 0.2 mol /L; (d) 0.3 mol /L; (e) 0.4 mol /L; (f) 0.5 mol /L.