Electronic Supplementary Information:

The Mn_2O_3 growth mechanism:

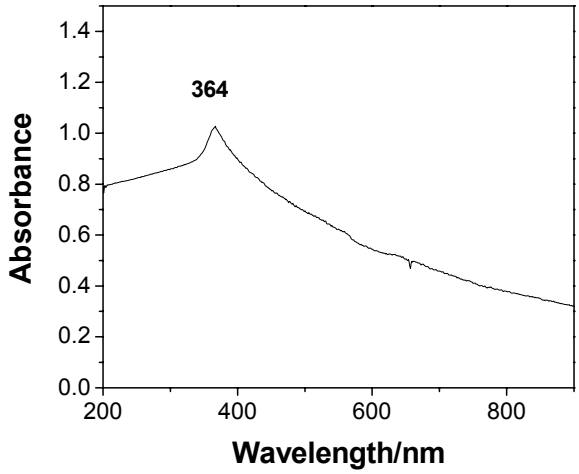
The shuttle-shaped Mn_2O_3 were produced by a two-stage reaction process similar to described by Cheng et al.,[1] and reactions were ascribed as the following equations:

$$Mn(CH_3COO)_2 + xH_2O \xrightarrow{\Delta} Mn(OH^-)_x(CH_3COO^-)_{2-x} + xCH_3COOH \quad (1)$$

$$2Mn(OH^-)_x(CH_3COO^-)_{2-x} + \frac{1}{2}O_2 \xrightarrow{\Delta} Mn_2O_3 + 2(x-1)H_2O + 2(2-x)CH_3COOH \quad (2)$$

Equation (1) is the hydrolysis reaction for $Mn(CH_3COO)_2$ to form manganese complexes. Then, the manganese complexes would dehydrate, remove acetic acid, and oxidize to form pure Mn_2O_3 as equation (2) during the aging time. Because the reaction process was in the air and ZnO nanocrystals may be similar to "catalyst" action, the reaction could progress at lower temperature.

The UV-Vis absorption spectrum of shuttle-shaped Mn_2O_3/ZnO nanocomposites:



ESI. UV-Vis absorption spectrum of shuttle-shaped Mn_2O_3/ZnO nanocomposites.

The UV-vis absorption spectra of the products were measured on a Shimadzu 3150 UV-vis-near-infrared spectrophotometer. ESI shows the absorption spectra of the shuttle-shaped Mn_2O_3/ZnO nanocomposites. The prominent band centered at 364 nm is known to originate from the band-edge absorption of ZnO nanocrystals.

Reference:

1 H. M. Cheng, H. C. Hsu, S. L. Chen, W. T. Wu, C. C. Kao, L. J. Lin and W. F. Hsieh *J. Cryst.*

Growth, 2005, **177,** 192