Supporting information to

Enabling High Solubility of ZnO in TiO_2 by Nanolamination of Atomic Layer Deposition

Chung-Yi Su[a], Chih-Chieh Wang[b], Yang-Chih Hsueh[a], Vitaly Gurylev[a], Chi-Chung Kei[c], and Tsong-Pyng Perng[a,*]

[a]Department of Materials Science and Engineering, National Tsing Hua University, Hsinchu 300, Taiwan

[b]Department of Materials Science and Engineering, Feng Chia University, Taichung 407, Taiwan

[c]Instrument Technology Research Center, National Applied Research Laboratories, Hsinchu 300, Taiwan

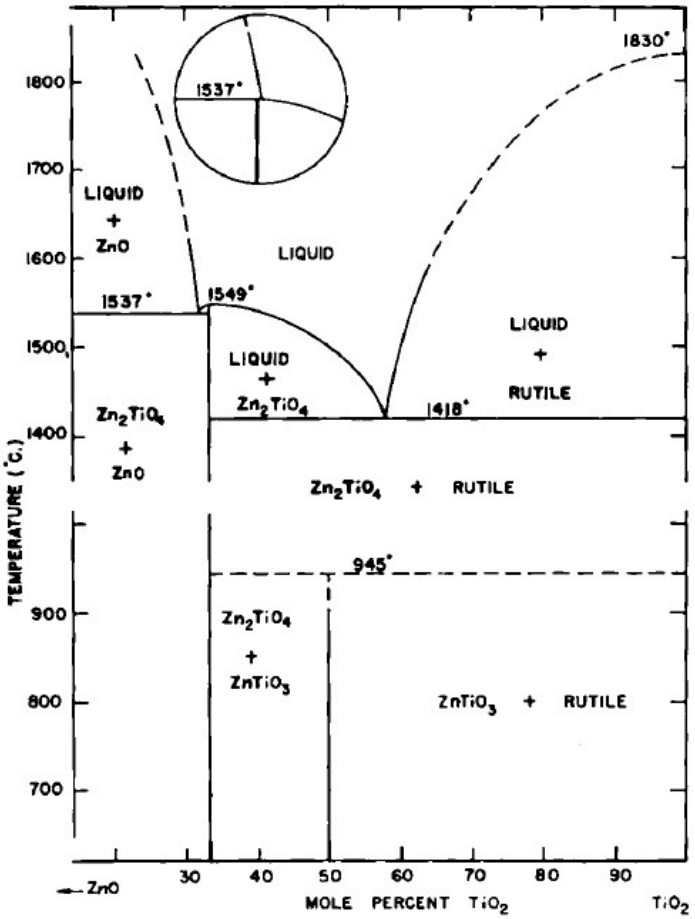

Figure S1. Phase diagram of ZnO-TiO_2 system.[7]

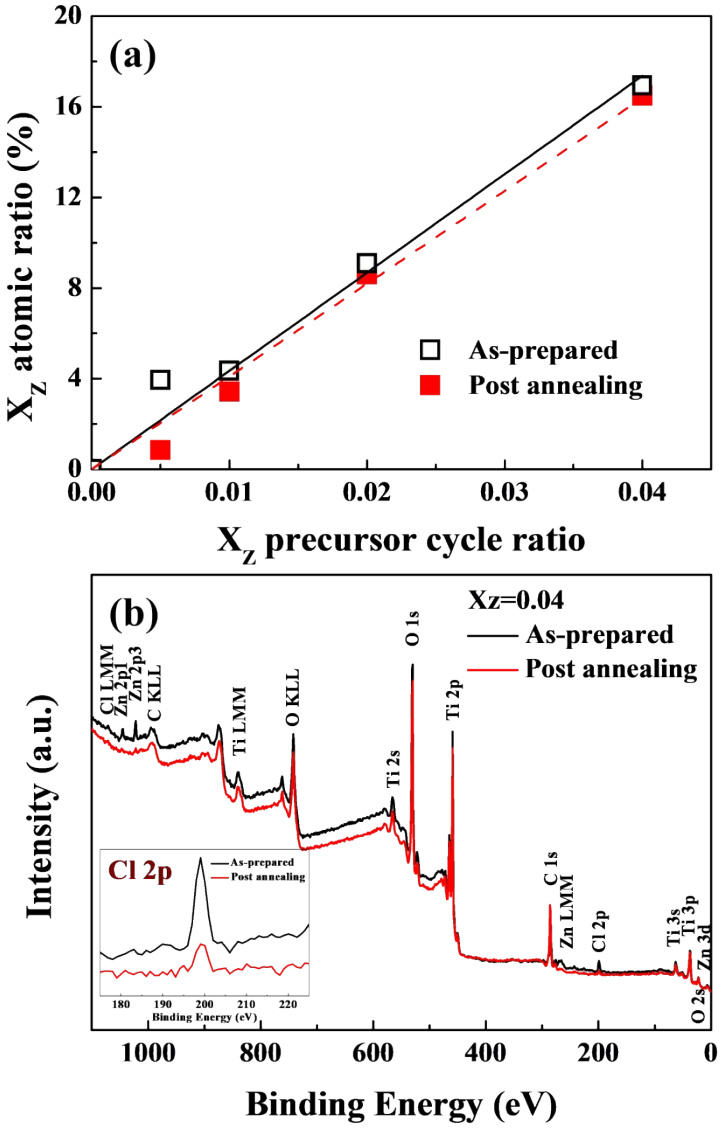

Figure S2. (a) Atomic ratios of Zn measured by XPS in Zn-doped TiO_2 nanotubes before and after annealing at 450 °C versus precursor cycle ratio. (b) XPS survey scans of Zn-doped TiO_2 with X_Z=0.04 before and after annealing. The inset in (b) is Cl 2p XPS spectra.

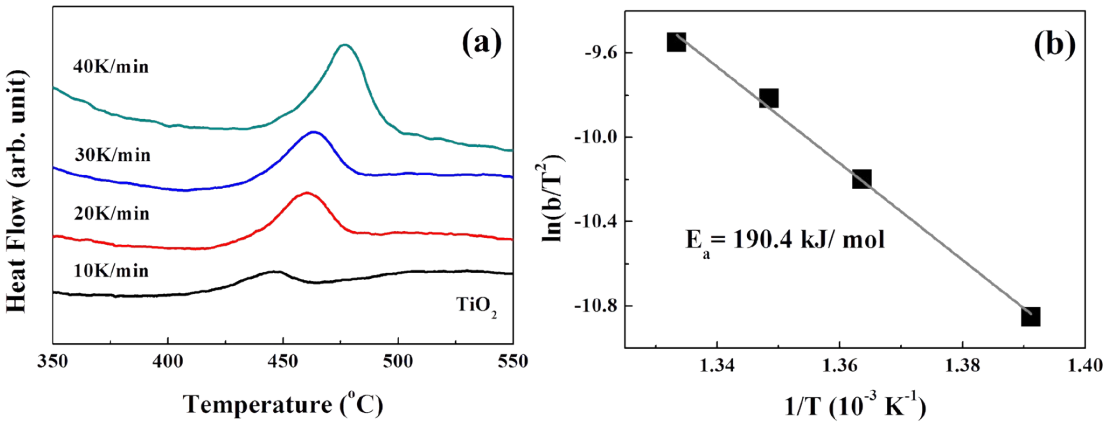

Figure S3. (a) DSC traces of as-deposited amorphous TiO_2 on PC at various heating rates. (b) Kissinger plot of the DSC peaks for crystallization of amorphous TiO_2.

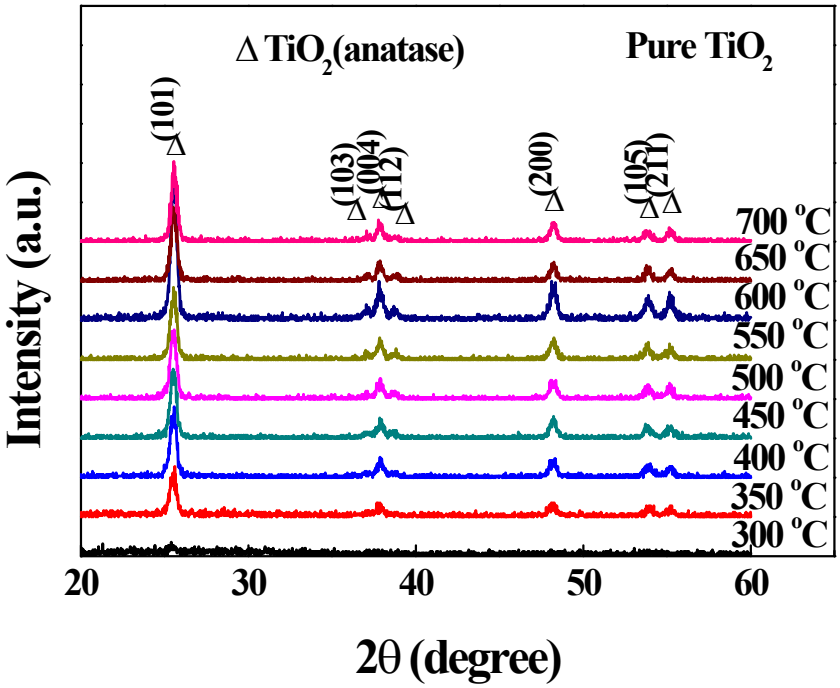

Figure S4. In-situ XRD patterns of pure TiO_2 prepared by ALD heated to different temperatures.

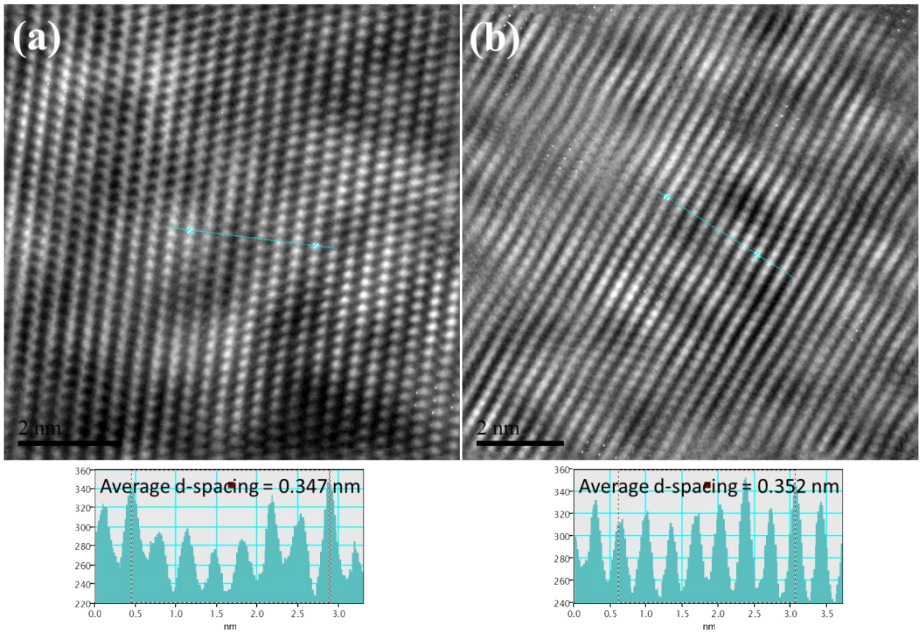

Figure S5. Fourier reconstructed TEM images and their corresponding lattice fringe profiles of (a) TiO_2 and (b) Zn-doped TiO_2 (X_Z=0.04).

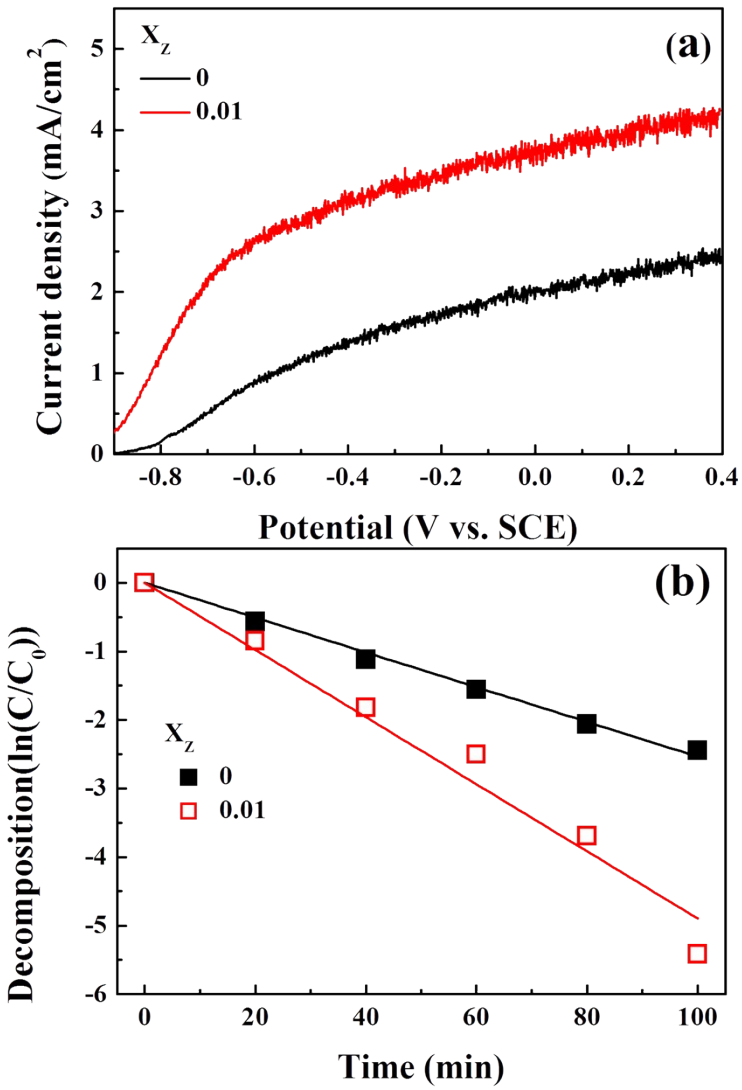

Figure S6 (a) Current-potential curves of pure TiO_2 and Zn-doped TiO_2 nanotubes by potentiodynamic scan at 10 mV/s under a 150W Xe lamp. (b) Photocatalytic decomposition of methylene blue by using pure TiO_2 and Zn-doped TiO_2 nanotubes as the photocatalysts.