Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supplementary Data

Annealing-Free Preparation of Anatase TiO_2 Nanopopcorns on Ti Foil via a Hydrothermal Process and Their Photocatalytic and Photovoltaic Applications

Jong-Yeob Kim,[a] Daeki Lee,[a] Hark Jin Kim,[b] Iseul Lim,[b] Wan In Lee[b] and Du-Jeon Jang*[a]

[a] *Department of Chemistry, Seoul National University, Seoul 151-747, Korea. Tel: +82 (2)-875-6624; E-mail: djjang@snu.ac.kr*

[b] *Department of Chemistry, Inha University, Incheon 402-751, Korea*

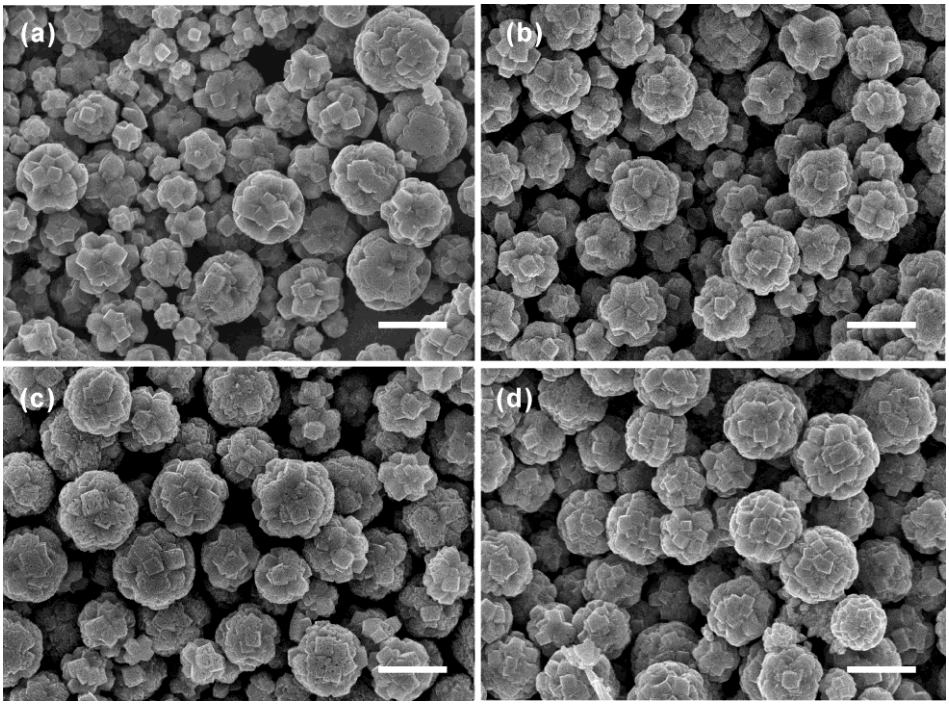

Fig. S1 SEM images of TiO_2 nanopopcorns grown on Ti foil with VR(H_2O_2:HF:H_2O) of (a) 0.5:1:1000, (b) 1:1:1000, (c) 2.5:1:1000, and (d) 5:1:1000. Each scale bar indicates 500 nm.

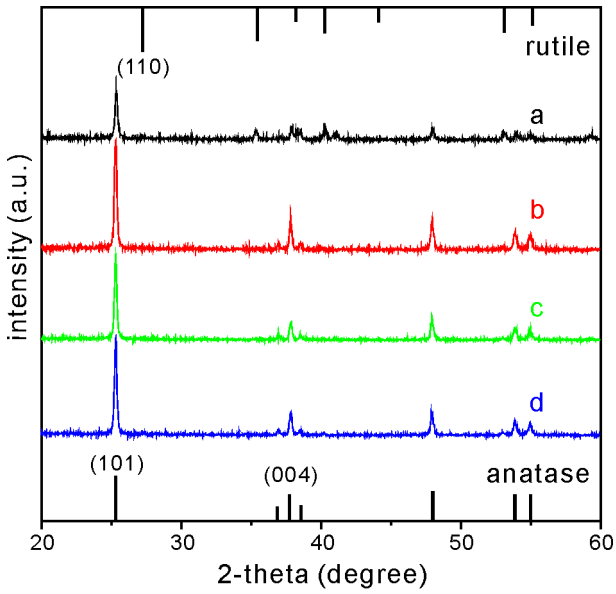

Fig. S2 XRD patterns of TiO_2 nanopopcorns grown on Ti foil at VR(H_2O_2:HF:H_2O) of (a) 0.5:1:1000, (b) 1:1:1000, (c) 1:2.5:1000, and (d) 5:1:1000. The standard diffraction lines of anatase TiO_2 and rutile TiO_2 are also shown for comparison.

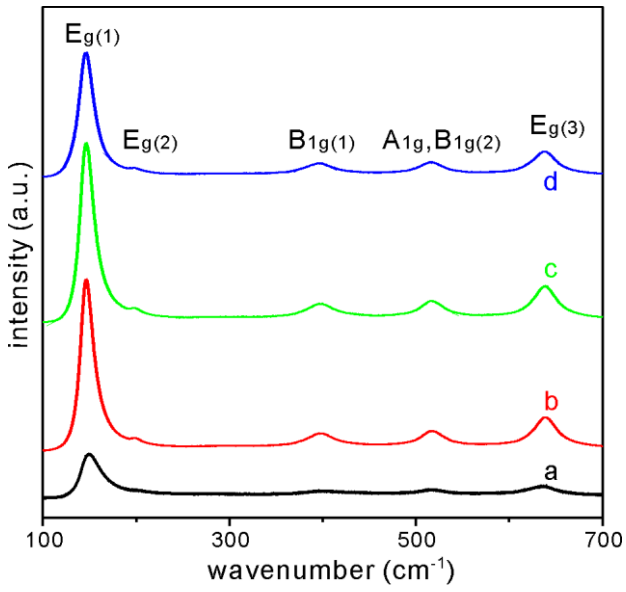

Fig. S3 Raman spectra of TiO_2 nanopopcorns grown on Ti foil with VR(H_2O_2:HF:H_2O) of (a) 1:0.5:1000, (b) 1:1:1000, (c) 1:2.5:1000, and (d) 1:5:1000.

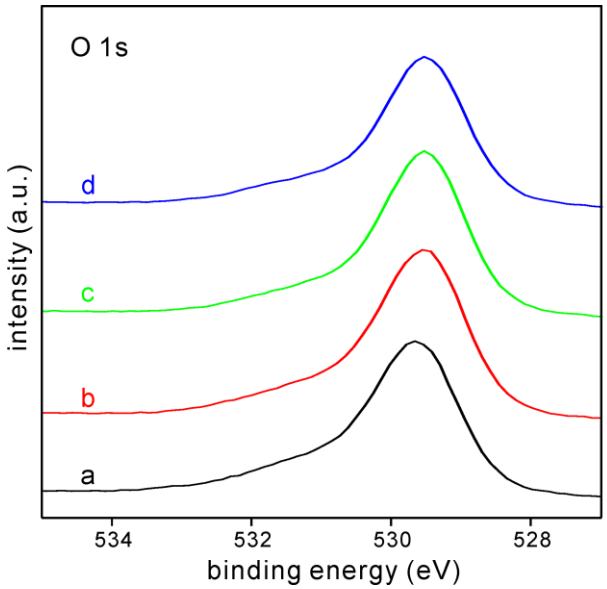

Fig. S4 XPS spectra of the O1s of TiO_2 nanopopcorns grown on Ti foil with VR(H_2O_2:HF:H_2O) of (a) 1:0.5:1000, (b) 1:1:1000, (c) 1:2.5:1000, and (d) 1:5:1000.

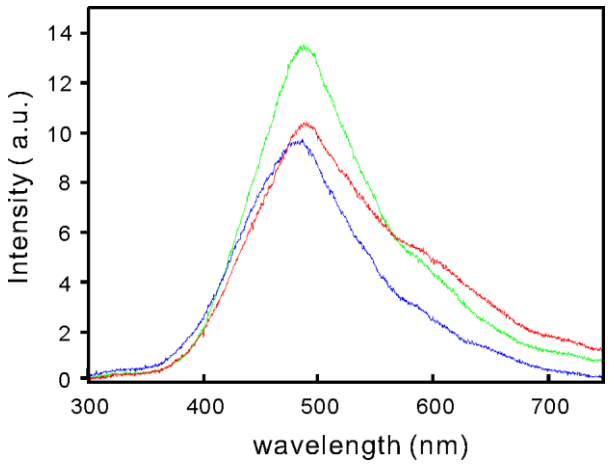

Fig. S5 Photoluminescence spectra of TiO_2 nanopopcorns grown on Ti foil. VR(H_2O_2:HF:H_2O) were (*blue*) 1:1:1000, (*green*) 1:2.5:1000, (*red*) 2.5:1:1000, and samples were suspended in water and excited at 266 nm.

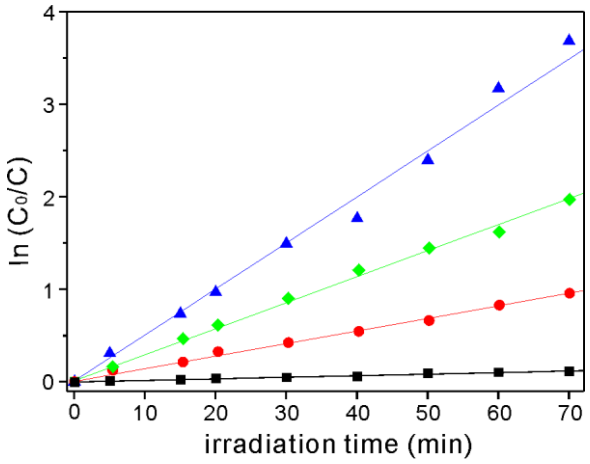

Fig. S6 Pseudo-first-order kinetic rate plots for the photocatalytic degradation of MB (360 ppm) at different concentrations of TiO_2 nanopopcorns grown at VR(H_2O_2:HF:H_2O) of 1:1:1000 on Ti foil. The masses of suspended nanopopcorns in 2 mL of water were (squares) 0.0, (circles) 1.2, (diamonds) 2.4, and (triangles) 4.8 mg. The rate constants obtained from the best-fitted lines with the nanopopcorns of 0.0, 1.2, 2.4, and 4.8 mg are 0.11, 0.96, 1.8, and 3.0 h^{-1}, respectively