Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Enhancement of Cyclability of Urchin-Like Rutile TiO_2 Submicron Spheres by Nanopainting with Carbon

Kyung-Soo Park,[‡] Kyung-Mi Min,[‡] Yun-Ho Jin, Seung-Deok Seo, Gwang-Hee Lee, Hyun-Woo Shim, and Dong-Wan Kim*

Department of Materials Science and Engineering, Ajou University, Suwon 443-749, Korea

[*] To whom correspondence should be addressed. E-mail: dwkim@ajou.ac.kr

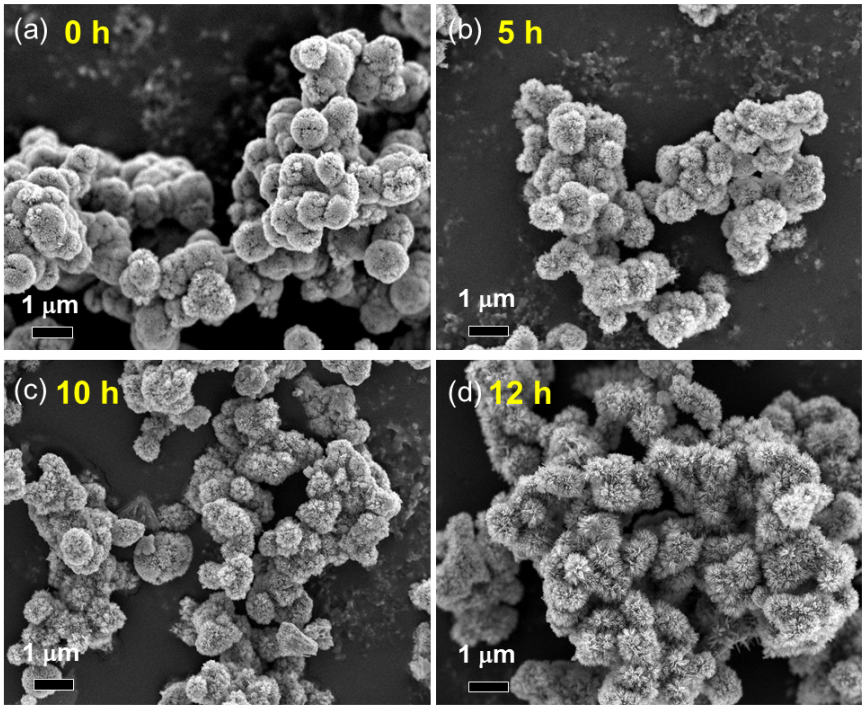

Figure S1. Low-magnification FE-SEM images showing morphological evolution of the U-TiO_2 submicron spheres synthesized at 90 °C for various reaction times: (a) 0, (b) 5, (c) 10, and (d) 12 h.

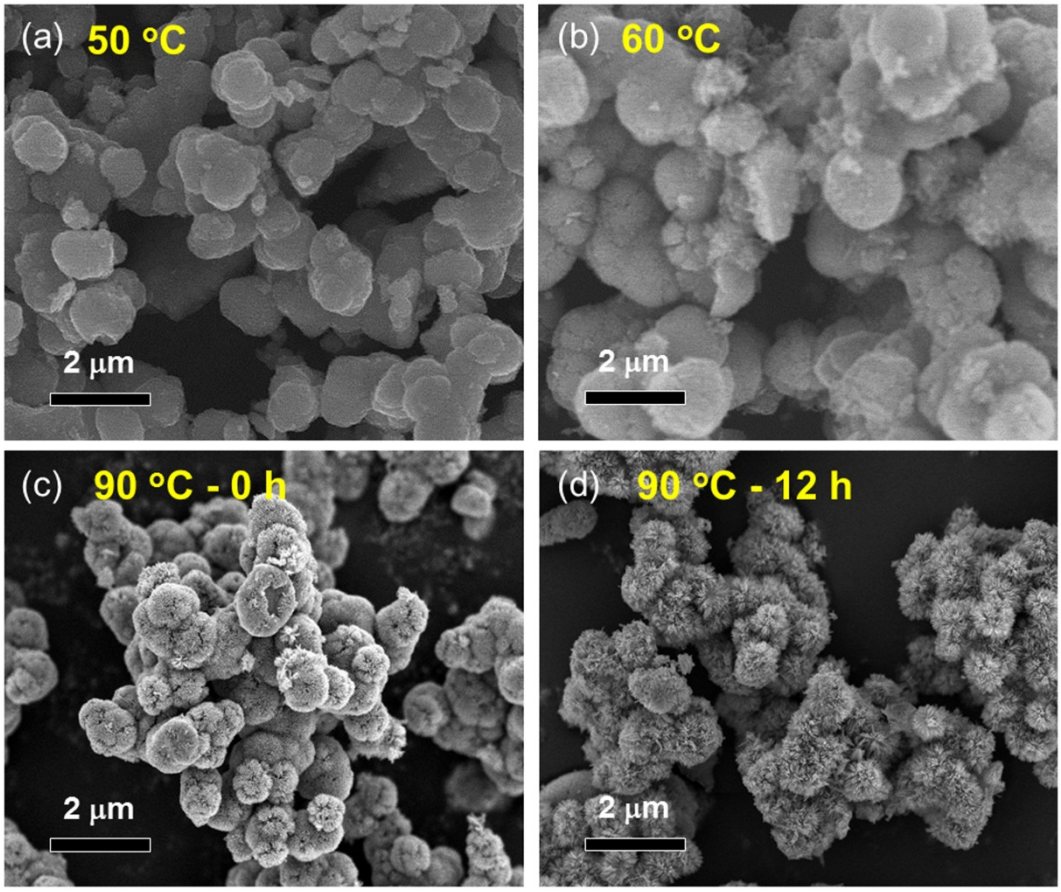

Figure S2. Typical FE-SEM images of U-TiO_2 submicron spheres synthesized using various synthetic temperatures and growth times: (a) 50 °C for 0 h, (b) 60 °C for 0 h, (c) 90 °C for 0 h, and (d) 90 °C for 12 h.

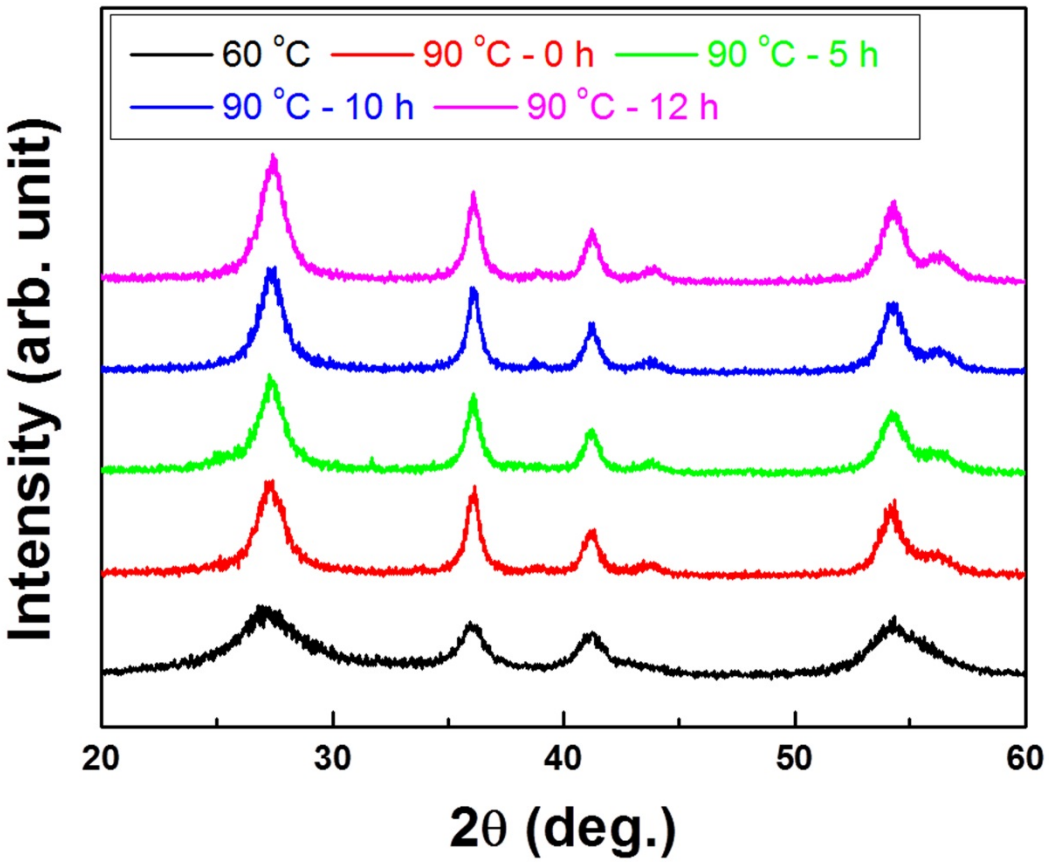

Figure S3. XRD patterns of the U-TiO_2 submicron spheres synthesized using various synthetic temperatures and growth times.

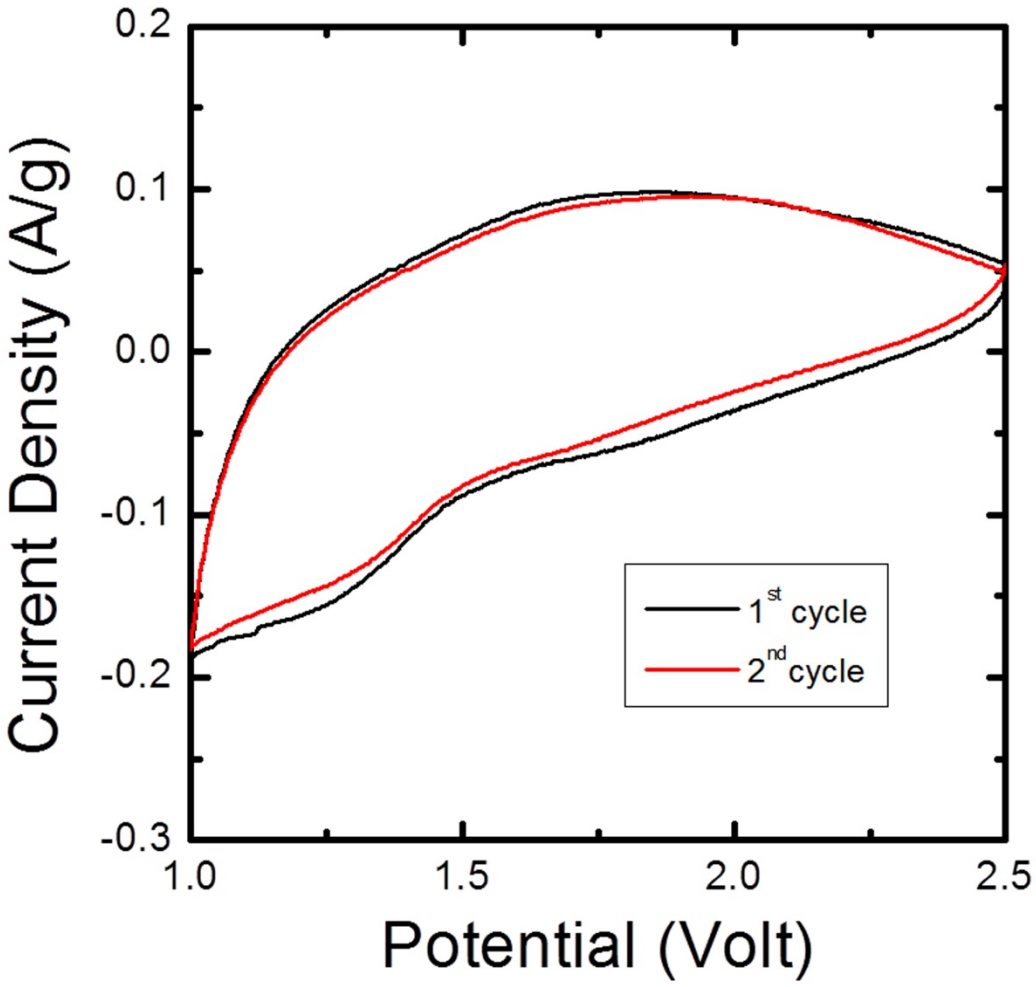

Figure S4. Typical cyclic voltammetry results for the U-TiO_2 submicron sphere electrode at a scanning rate of 0.3 mV/s.

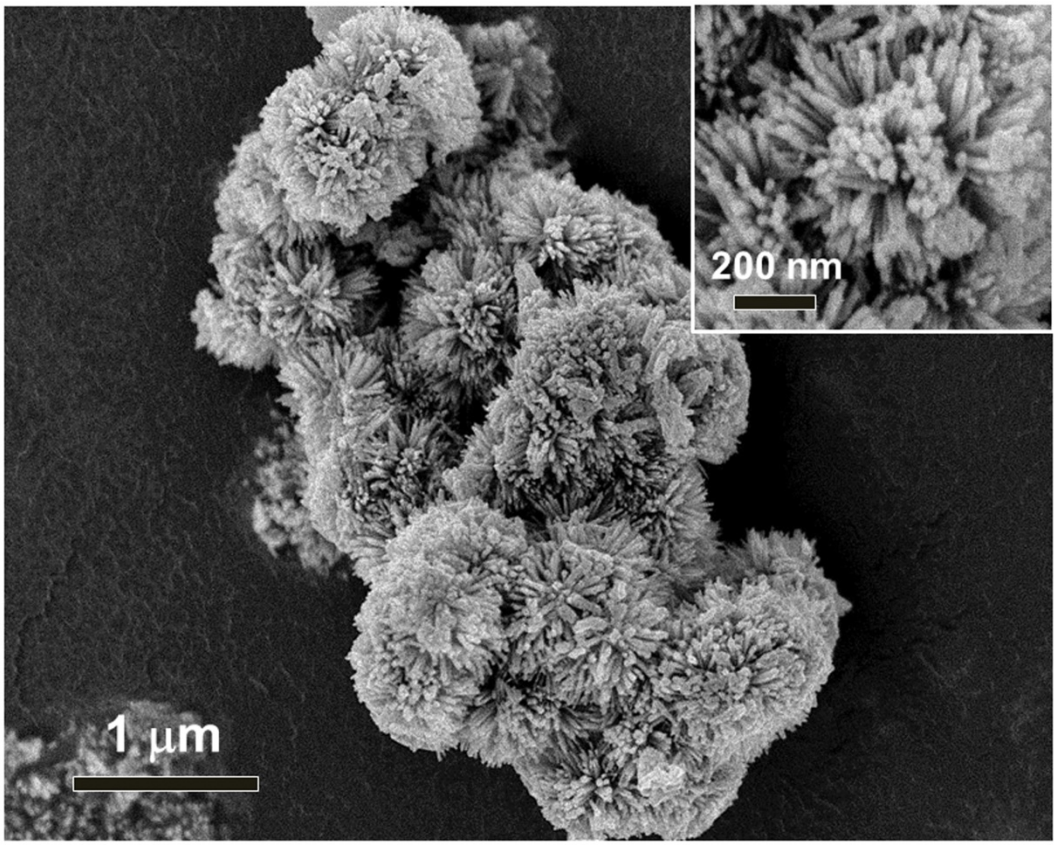

Figure S5. Typical low- and high-magnification (inset) FE-SEM images of the carbon-coated U-TiO_2 submicron spheres.

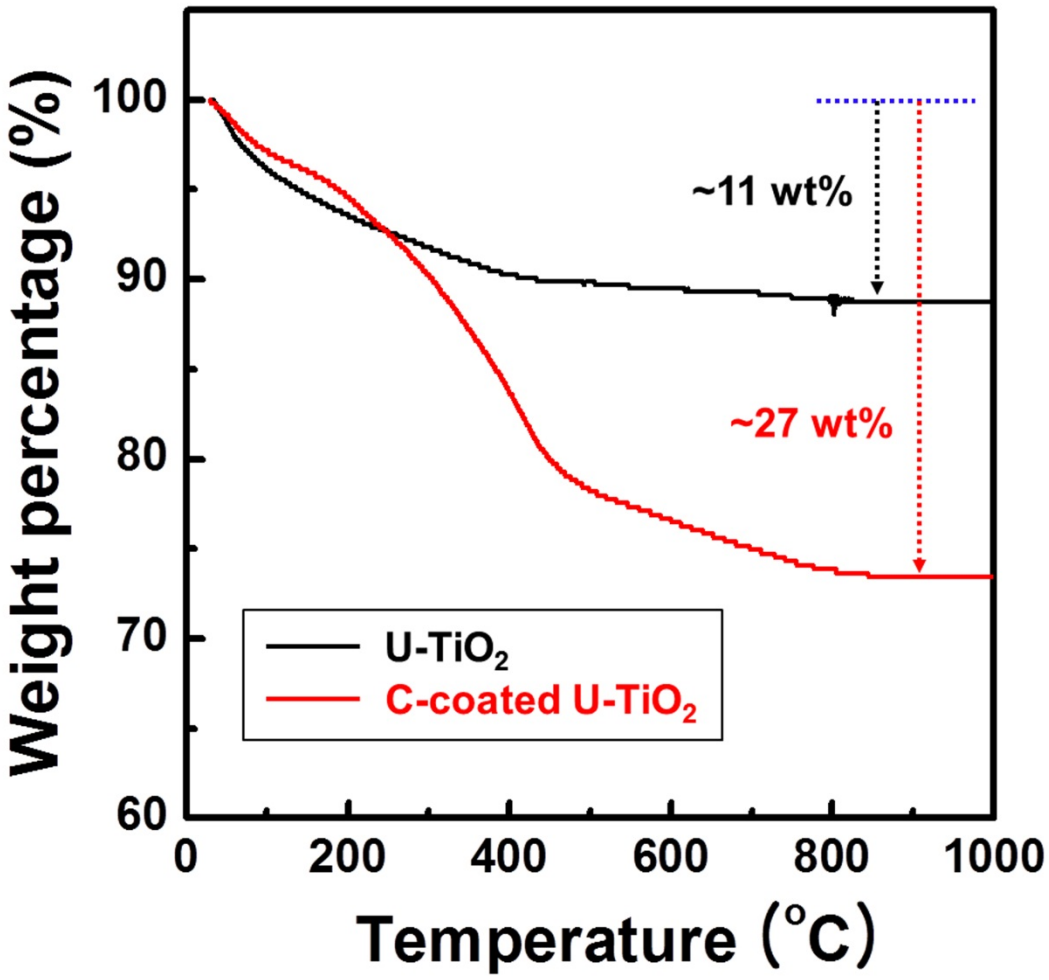

Figure S6. TG curves for the as-prepared and carbon-coated U-TiO_2 submicron spheres at a heating rate of 10 °C/min in air.

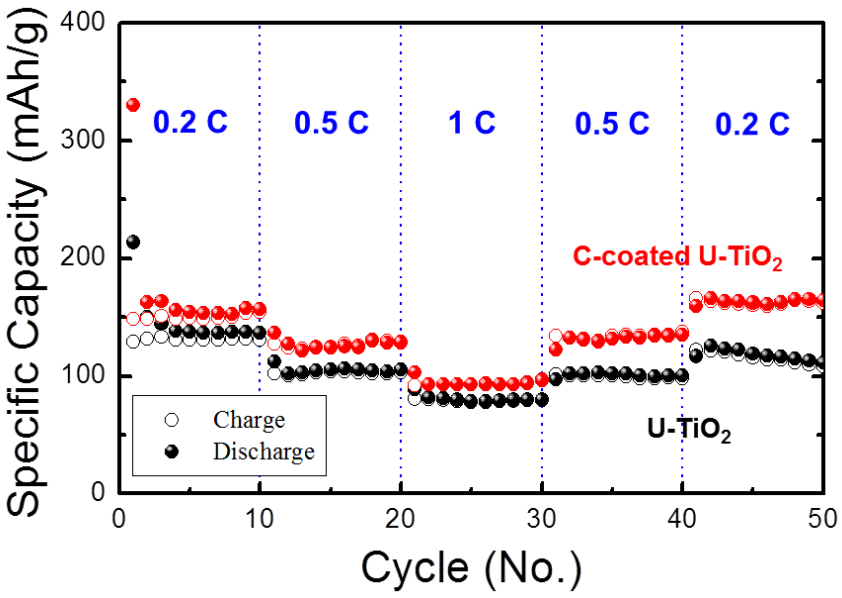

Figure S7. Rate capability of the carbon-coated and as-prepared U-TiO_2 submicron sphere electrodes at various current densities of 0.2, 0.5, and 1 C.

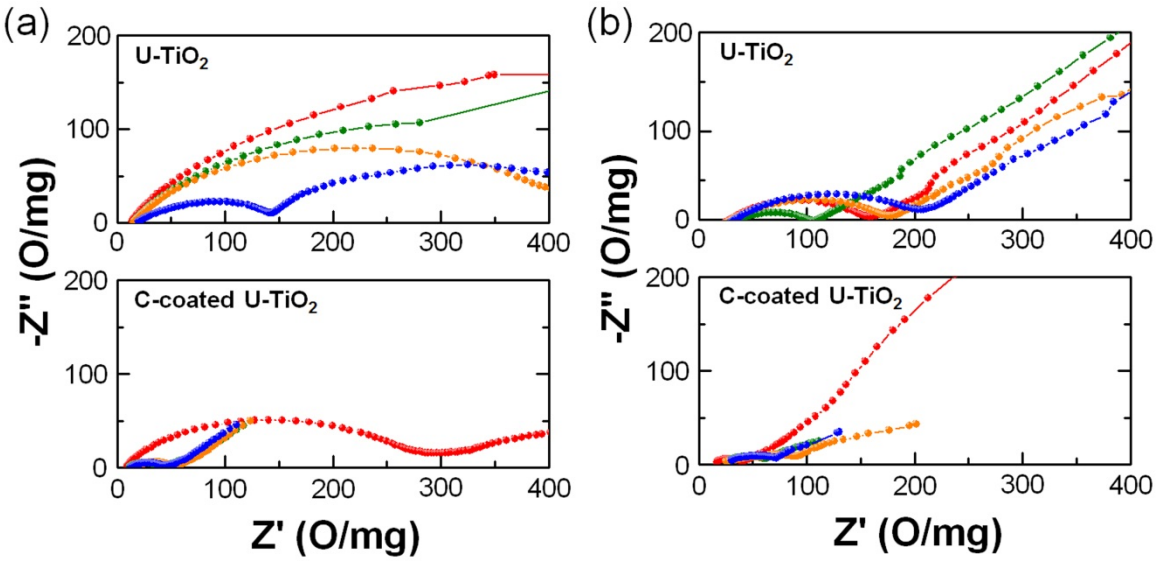

Figure S8. Nyquist plots collected at the 1st (red line), 2nd (green line), 5th (orange line), and 10th (blue line) (a) discharged and (b) charged states of carbon-coated and as-prepared U-TiO_2 submicron sphere electrodes.