

Supplementary Information

Fabrication of Uniform Anatase TiO₂ Particles Exposed by {001} Facets

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Experimental information of controlling samples

TiF₄ aqueous solution was prepared by the method reported previously.¹ Hydrochloric acid (HCl, 1.5 M) was used to adjust the pH of deionized water (1.0 L) to 2.1. Titanium tetrafluoride (TiF₄, Aldrich Chemical) was then dissolved in this solution under vigorous stirring to give a concentration of 0.04 M. In a typical experiment, deionized water was used to dilute above TiF₄ aqueous solution (0.04 M) to a concentration of 2.5 mM. Then 60 mL of adjusted TiF₄ aqueous solution was added into a Teflon-lined stainless steel autoclave. The autoclave was kept at 170 °C for 6 - 14 h in an electric oven. After reaction, the products were separated by centrifugation, washed with deionized water for 5 times and then dried in vacuum at 60 °C for 7 h. Table 1 shows the detailed experimental parameters to synthesize TiO₂ particles without using disodium ethylene diamine tetraacetate (EDTA).

Table 1 TiO₂ particles prepared without using EDTA.

Sample name	Concentration of TiF ₄ (mM)	Temperature (°C)	Time (h)
S1	2.5	170	6
S2	2.5	170	14

Materials Characterization

The morphology and structure of the samples were characterized by high-resolution

transmission electron microscopy and selected area electron diffraction (HRTEM/SAED, Philips Tecnai T30F FEG Cryo AEM), scanning electron microscopy (SEM, JEOL JSM6400F), X-ray spectroscopy (XRD, Bruker D8 Advanced Diffractometer, Cu KR radiation, 40 kV). Surface binding elements were analyzed with X-ray photoelectron spectroscopy (XPS, Kratos Axis Ultra DLD). All binding energies were referenced to the C1s peak (284.8 eV) arising from surface hydrocarbons (or possible adventitious hydrocarbon). Prior peak deconvolution, X-ray satellites, and inelastic background (Shirley-type) were subtracted for all spectra. Samples were centrifuged and washed with deionized water twice and then redispersed in water and dropped on a conductive SEM sample holder or a carbon-coated copper grid with irregular holes for TEM analysis. Samples for XPS were prepared by drying the sedimented particles 24 h at 30 °C then slightly grinding and drying another 4 h at 60 °C so that the samples were fully dried.

Reference

1. H. G. Yang, C. H. Sun, S. Z. Qiao, J. Zou, G. Liu, S. C. Smith, H. M. Cheng and G. Q. Lu, *Nature*, 2008, **453**, 638.

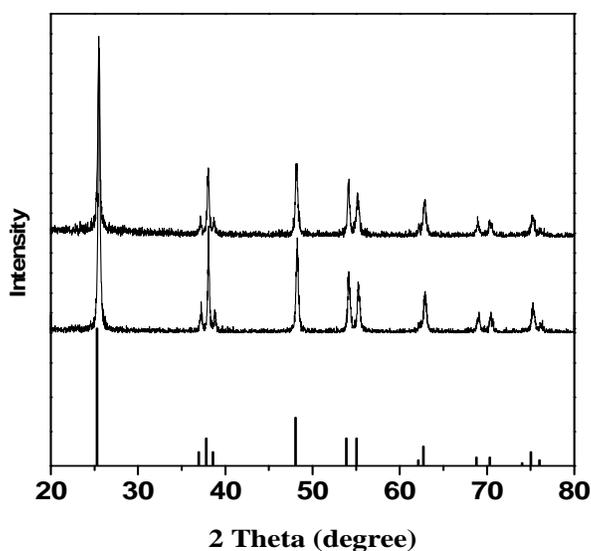


Fig. S1 XRD patterns of samples S1 (above) and S2 (below).

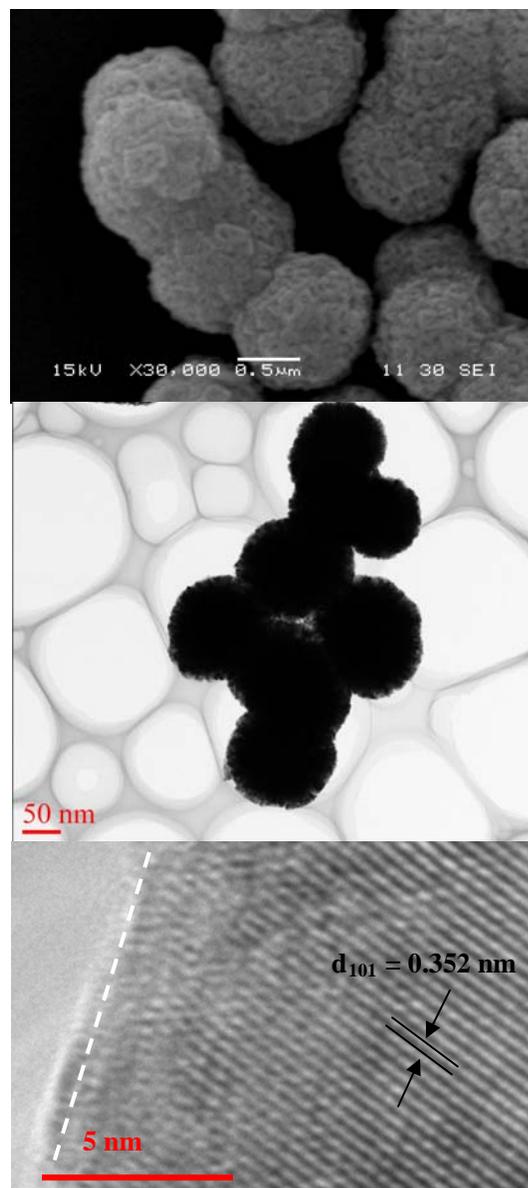


Fig. S2 SEM/TEM/HRTEM images of sample S1.

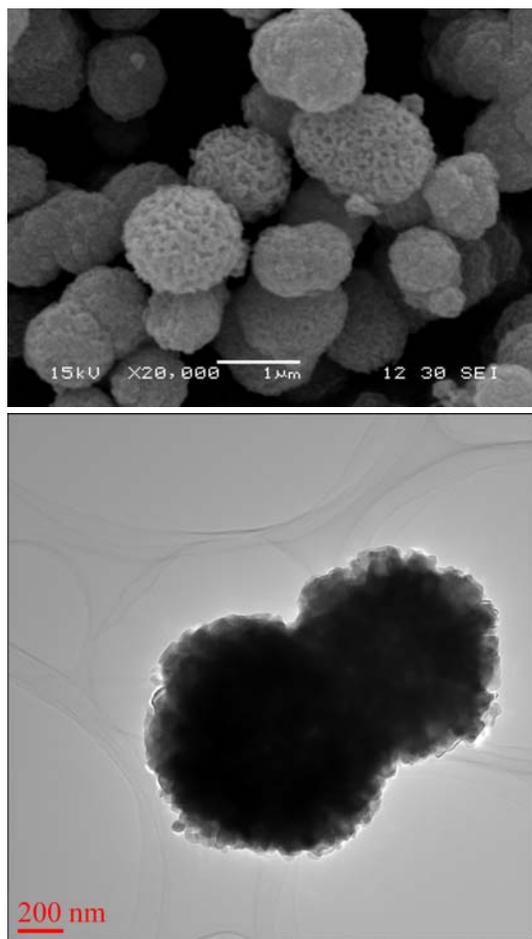


Fig. S3 SEM/TEM images of sample S2.