Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Anatase TiO_2 Microspheres with Reactive {001} Facets for Improved Photocatalytic Activity

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Estimation of the (001) surface percentage

The fraction of {001} facets was estimated by measuring the dimensions of the crystallites from FESEM images and calculating the respective areas of the {101} and {001} facets. The fraction of {001} facets was calculated by assuming that these two planes make up nearly 100% of all the surfaces and using:

$$\text{Fraction of } \{001\} \text{ facets} = \sum A_{(001)} / (\sum A_{(001)} + \sum A_{(101)})$$

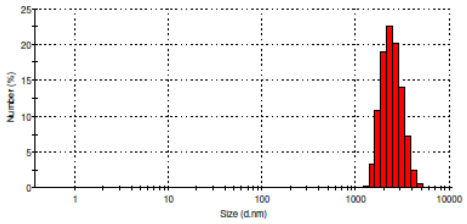

Figure SI-1. Dynamic light scattering size distributions for TiO_2 microspheres

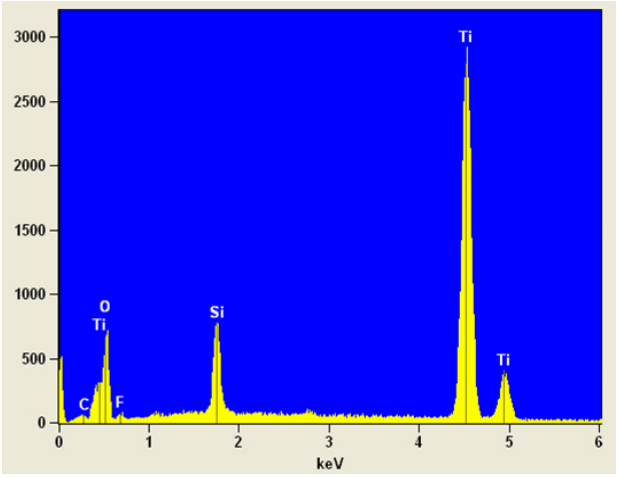

Figure SI-2. Energy dispersive X-ray spectroscopy (EDX) spectrum of anatase TiO_2 microspheres synthesized after 4 hours of hydrothermal reaction prior to NaOH washing. Note: Silicon signal comes from the silicon wafer used for FESEM characterization.

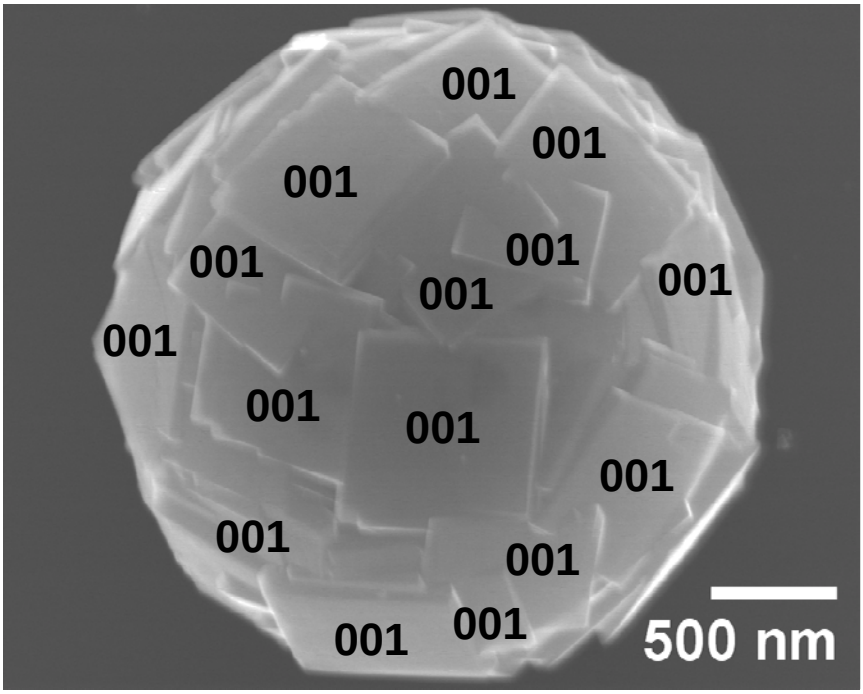

Figure SI-3. FESEM image of an individual anatase TiO_2 microsphere synthesized after 4 hours of hydrothermal reaction, showing the exposed {001} facets.

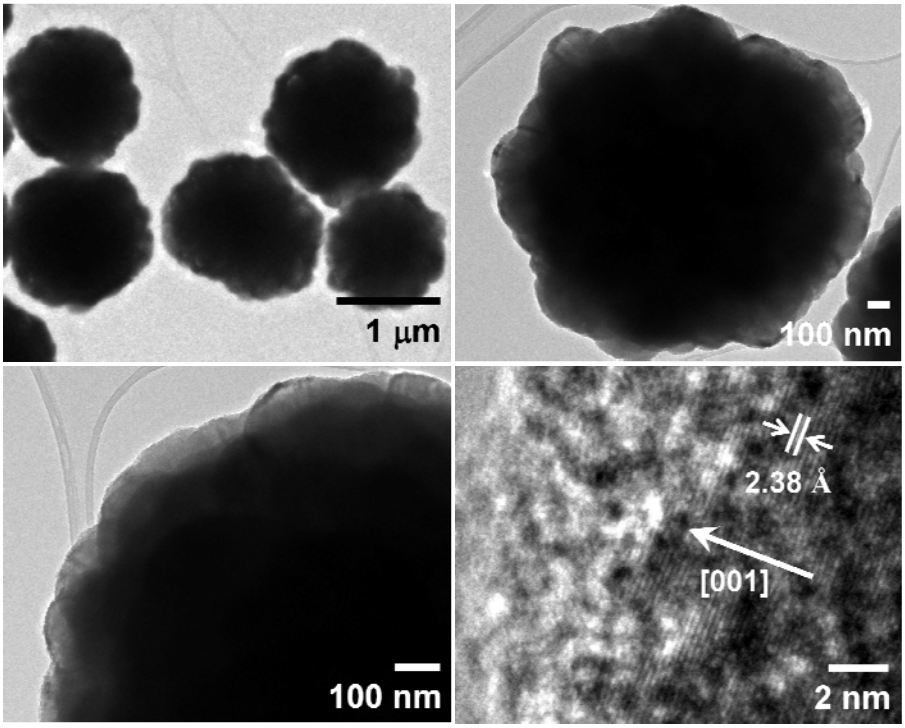

Figure SI-4. TEM and HRTEM images of anatase TiO_2 microspheres synthesized after 1 hour of hydrothermal reaction.

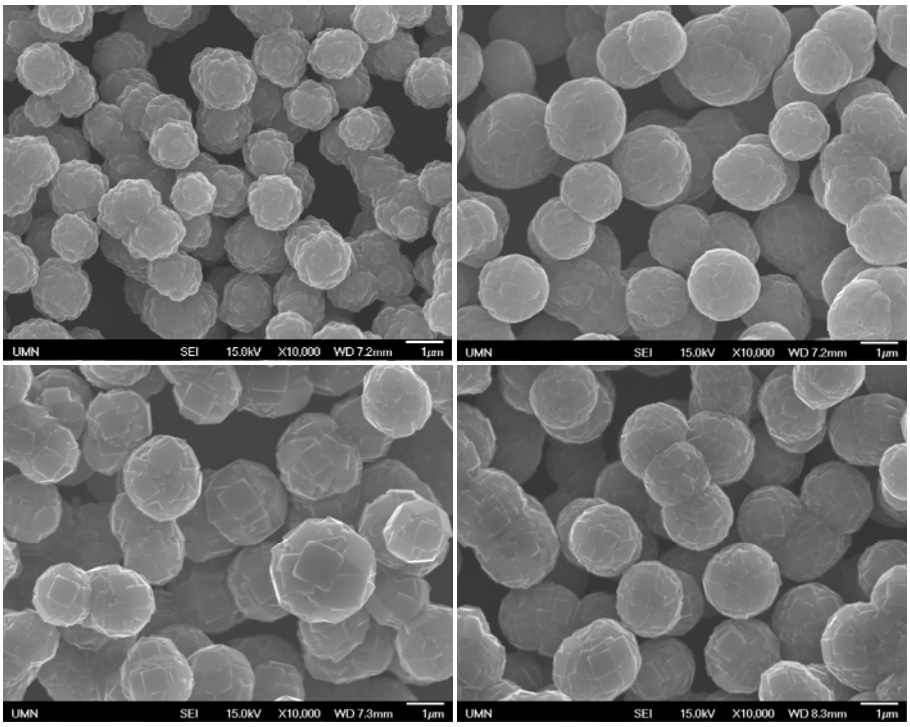

Figure SI-5. FESEM images of anatase TiO_2 microspheres synthesized after different amount of reaction times. (a) 1 hour, (b) 2 hours, (c) 3 hours, and (d) 4 hours.

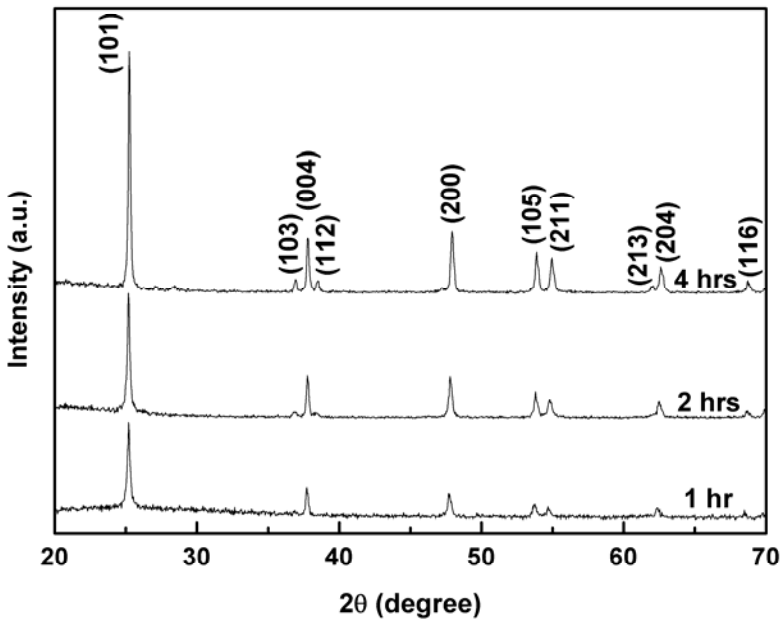

Figure SI-6. XRD patterns of anatase TiO_2 microspheres synthesized after different amount of reaction times.

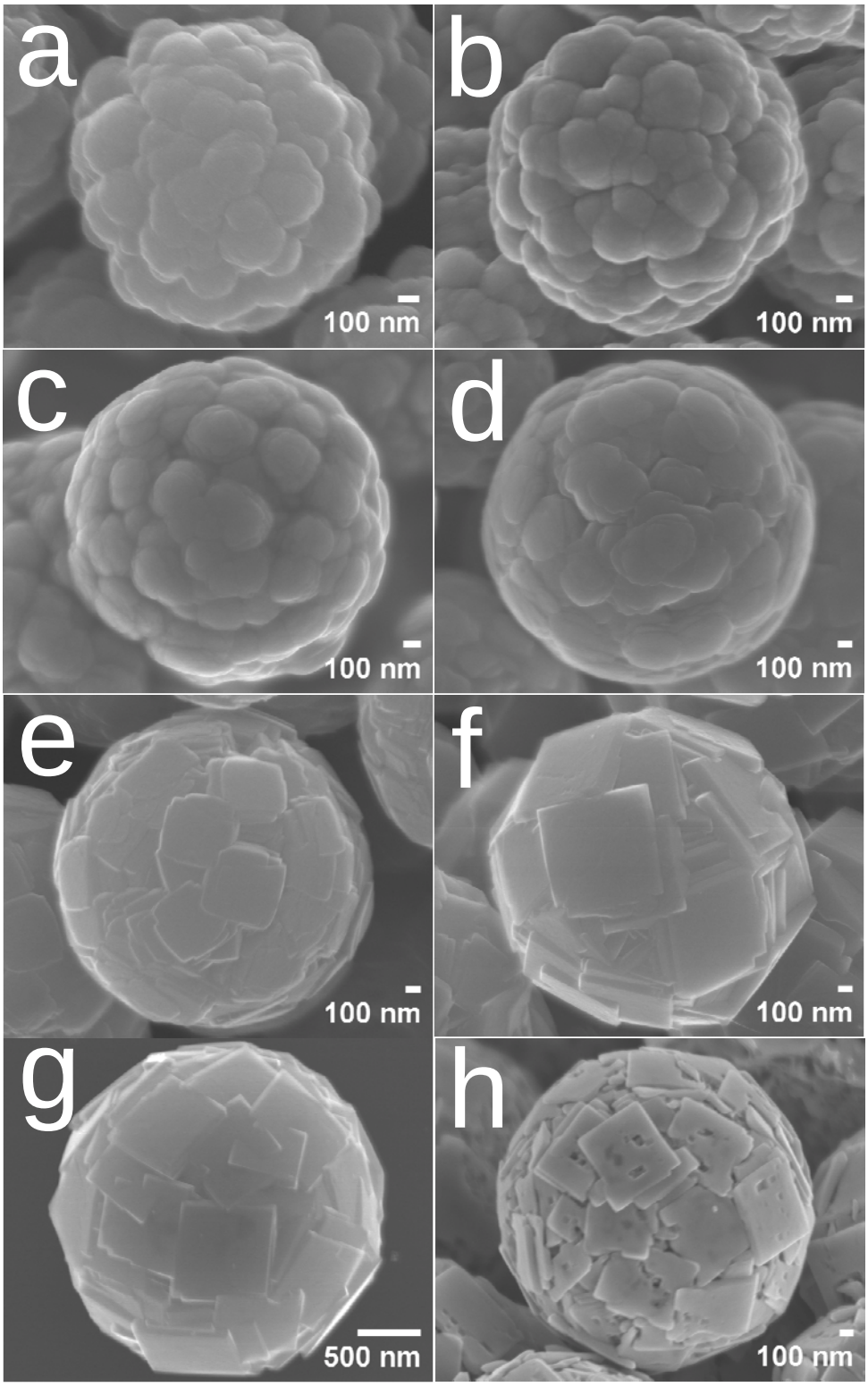

Figure SI-7. FESEM images of anatase TiO_2 microspheres synthesized after different amount of reaction times, showing the surface morphology transformation. Reaction time: (a) 1 hour, (b) 1.25 hours, (c) 1.5 hours, (d) 1.75 hours, (e) 2 hours, (f) 3 hours, (g) 4 hours, and (h) 4.5 hours.

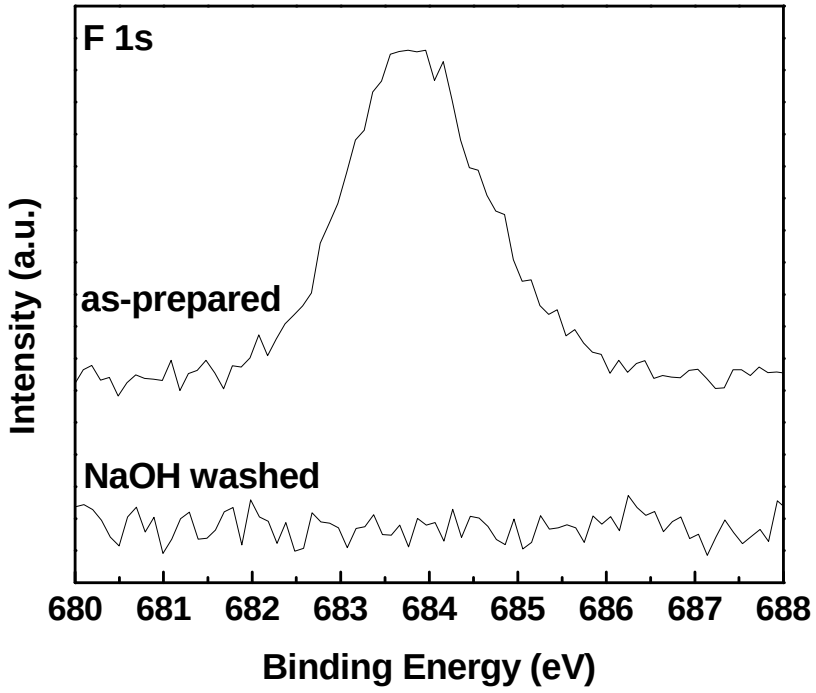

Figure SI-8. XPS spectrum of the anatase TiO_2 microspheres with and without NaOH washing, showing the characteristic peak from F.

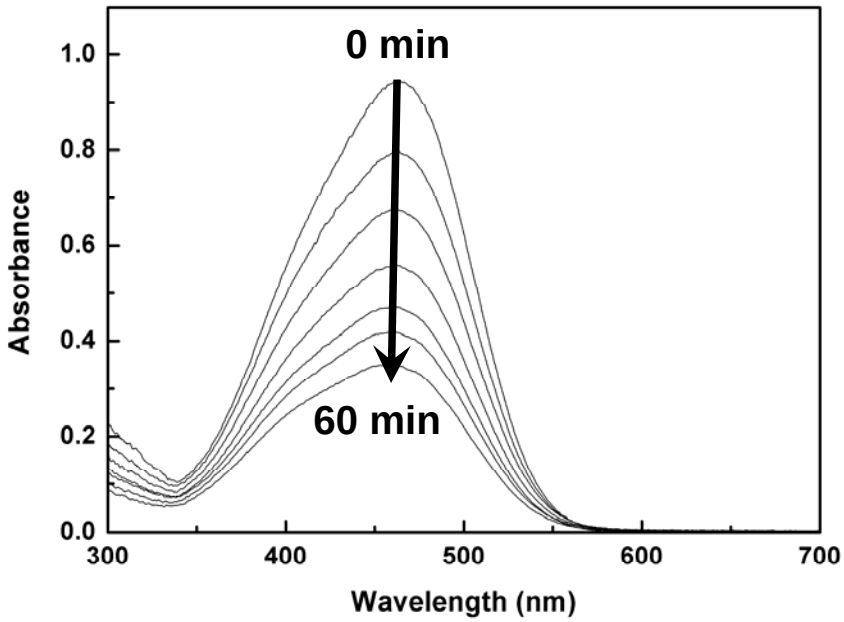

Figure SI-9. UV-vis absorption spectra of MO solution degraded by anatase TiO_2 microspheres synthesized after 4 hours of hydrothermal reaction for different amount of degradation time under UV irradiation.