Electronic Supplementary Information for

Formation of Large 2D Nanosheets via PVP-assisted Assembly of Anatase TiO_2 Nanomosaics

Xiong Wen (David) Lou*

Email: xwlou@ntu.edu.sg

Experimental Section

Materials Synthesis

The large 2D mosaic nanostructure is synthesized by adding 1.5 ml of 48% HF into 5 ml of titanium isopropoxide (TIP: 97%, Sigma Aldrich) under mild stirring. *Caution! HF is highly corrosive and it must be handled with great care.* Subsequently, 0.5 – 1.2 ml of 0.1 g ml^{-1} polyvinylpyrrolidone (PVP: M.W. ~ 1.3×10^6) solution was added into the mixture dropwise. The reaction medium was then transferred into a 40 ml Teflon-lined stainless steel autoclave and heated at 180 ^oC for 2 – 24 h. It was then cooled naturally to room temperature. The white product was harvested and washed thoroughly with DI water by centrifugation, which was then dried at 60 ^oC overnight.

Materials Characterization

The morphology of products was examined by transmission electron microscope (TEM; JEOL, JEM-2100F, 200 kV, with electron diffraction), field-emission scanning electron microscope (FESEM; JEOL, JSM-6700F, 5 kV). Crystallographic information of the samples was investigated with X-ray powder diffraction (XRD; Bruker, D8 - Advance X-Ray Diffractometer, Cu Kα, λ = 1.5406 Å).

Photocatalytic degradation

The photocatalytic degradation of organic dye was carried out by dispersing 10 mg of TiO_2 sample (e.g., nanomosaic or P25 nanoparticles) into 10 ml of 25 ppm of RhB. The mixture was first stirred in dark for 1 h to assure that the adsorption/desorption equilibrium between the TiO_2 catalyst and RhB is reached. UV radiation was then introduced with a wavelength peak at 365 nm under continuous stirring. The concentration of RhB was determined from the absorbance at the wavelength of 553 nm.

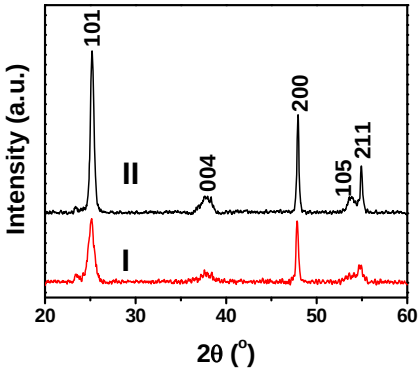

Figure S1. X-ray diffraction patterns of the samples shown in Fig 2A (I) and 2B (II).