Lattice-Strain Directed Synthesis of Anatase TiO_2 Single-Crystal Microplatelet Arrays on α-MoO_3 (010) Template

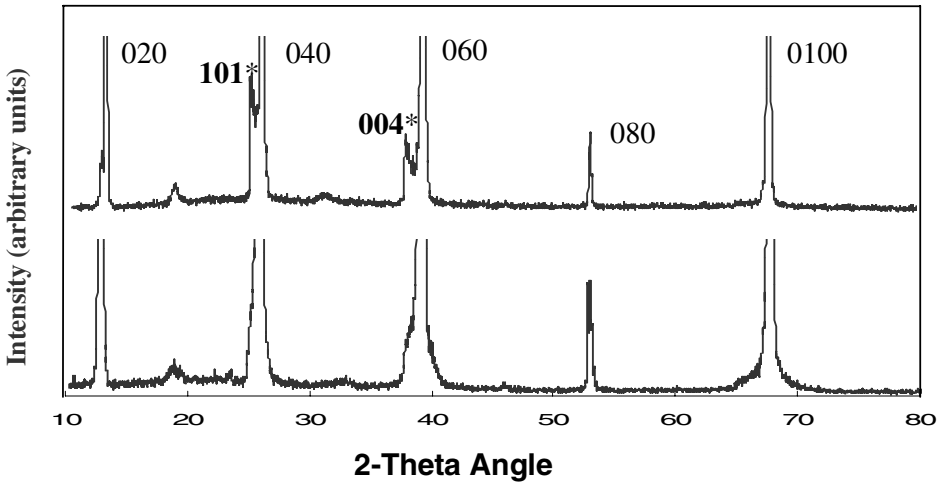
Hua Gui Yang and Hua Chun Zeng*

Department of Chemical and Environmental Engineering, Faculty of Engineering

National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260

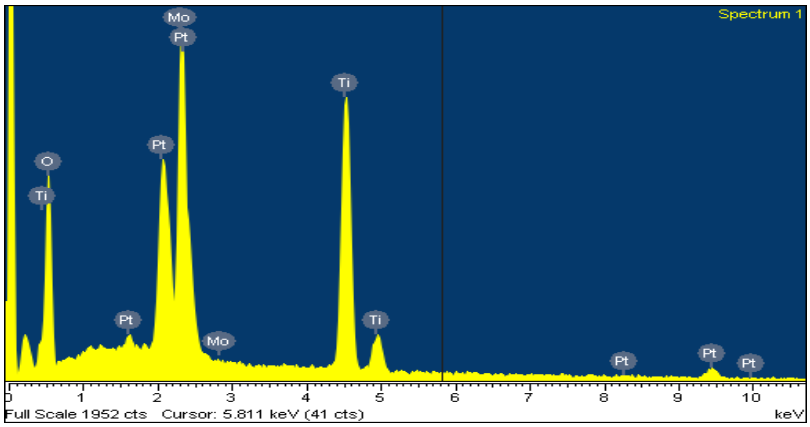
Supporting Information 1:

XRD pattern of anatase TiO_2 microplatelets grown on the (010) surface of α-MoO_3 template: (a) anatase TiO_2 microplatelets (peaks indicated with an asterisk) on the (010) surface of α-MoO_3, and (b) the (010) surface of α-MoO_3 for reference. Experimental conditions: [TiF_4] = 4.0 mM (30 mL), TiF_4/EDTA molar ratio = 2.234; at 200°C for 4 h.



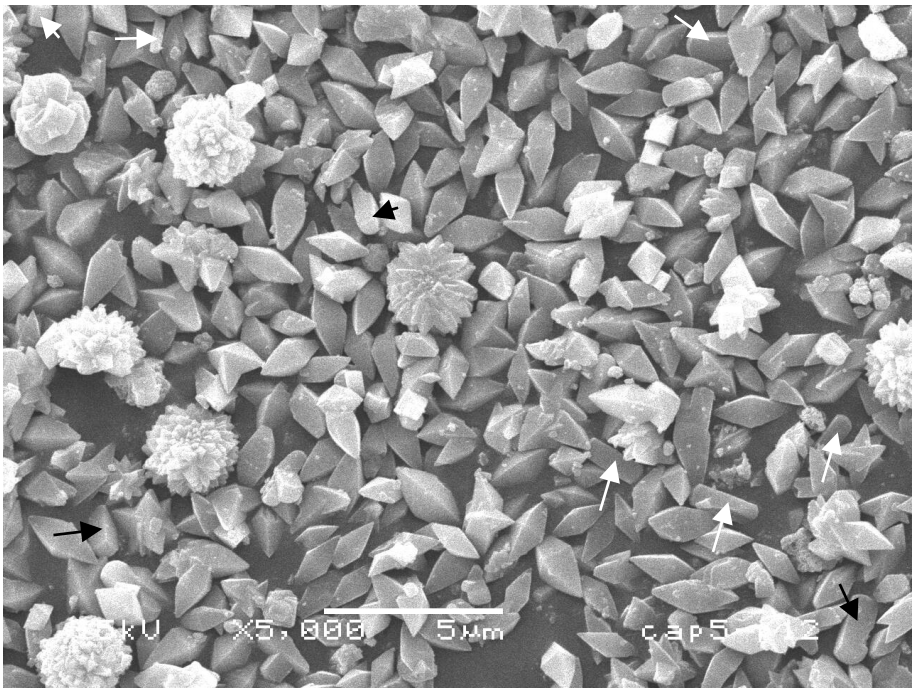
Supporting Information 2:

EXD results for anatase TiO_2 microplatelets grown on the (010) surface of α-MoO_3 template. The Pt signal is generated from Pt coating used for the measurement. Experimental conditions: [TiF_4] = 1.33 mM (30 mL), TiF_4/EDTA molar ratio = 0.75; at 200°C for 6 h.

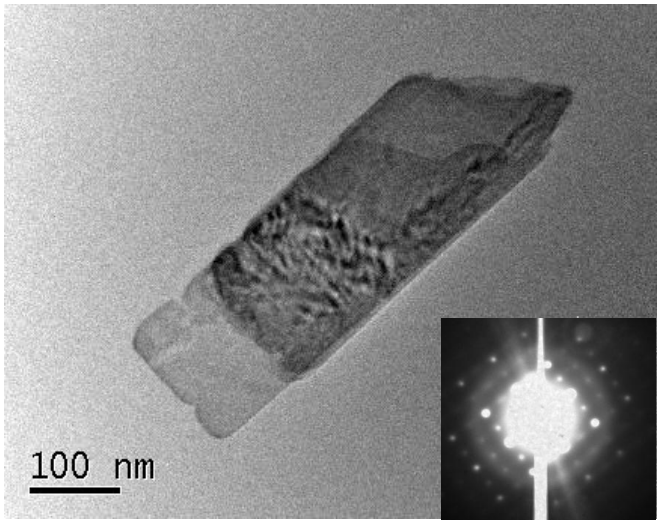


Supporting Information 3:

(i) SEM image for bipyramidal microcrystals of anatase TiO_2 grown without α-MoO_3 template. Some smaller crystallites with the {001} surfaces are indicated with arrows. Experimental conditions: [TiF_4] = 1.33 mM (30 mL), TiF_4/EDTA molar ratio = 0.75; at 170°C for 10 h.

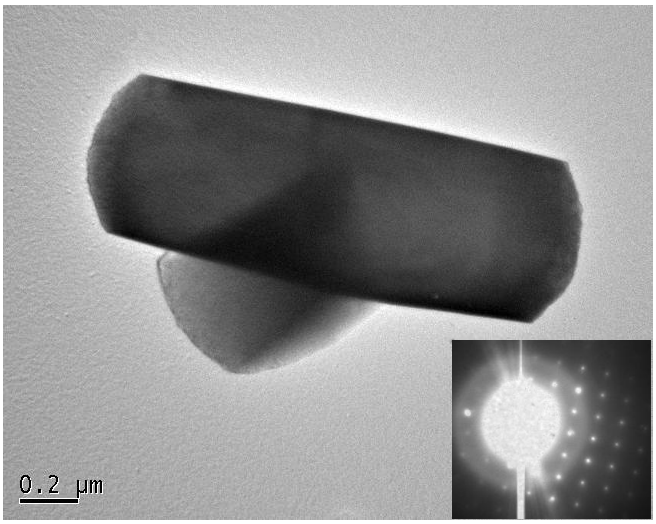


(ii) TEM image and ED pattern of the smaller TiO_2 crystallites with the {001} surfaces. Experimental conditions: [TiF_4] = 1.33 mM (30 mL), TiF_4/EDTA molar ratio = 0.75; at 170°C for 10 h.

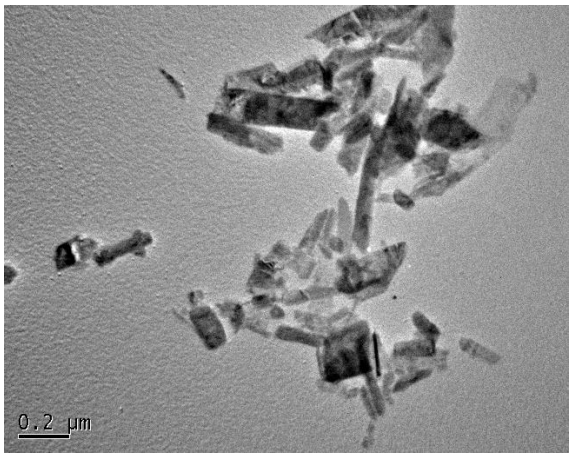


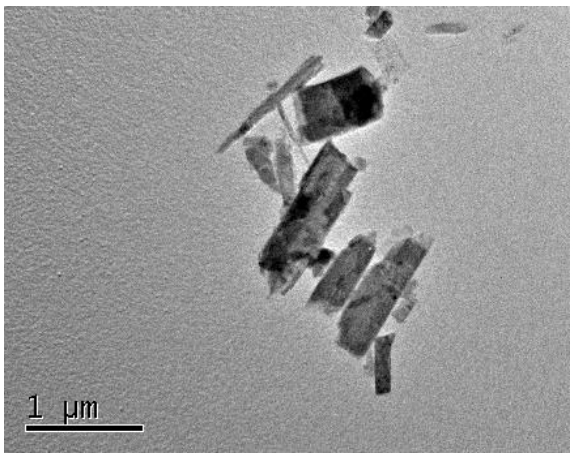
Supporting Information 4:

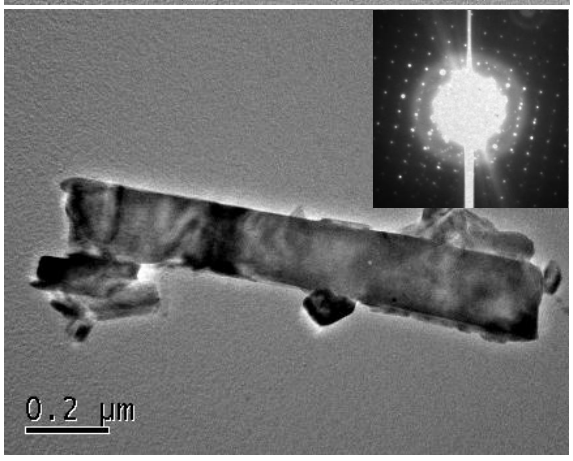
(i) TEM image and ED pattern for [001] oriented anatase TiO_2 microcrystals (together with bipyramidal microcrystals) grown without α-MoO_3 template. Experimental conditions: [TiF_4] = 1.33 mM (30 mL), TiF_4/EDTA molar ratio = 0.72; at 150°C for 25 h. It should be mentioned that without adding EDTA, {001} facets cannot be observed, although the conditions here (as well as those in SI-3) are not exactly identical to Figures 2 to 4 in the main text.



(ii) TEM images and ED pattern for [001] oriented anatase TiO_2 crystallites (together with some bipyramidal microcrystals) grown without α-MoO_3 template. Note that population of bipyramidal microcrystals has been significantly reduced. Experimental conditions: [TiF_4] = 1.33 mM (30 mL), TiF_4/EDTA molar ratio = 0.72; at 200°C for 5 h.







Supporting Information 5:

TEM image and ED pattern for anatase TiO_2 overlayers without using EDTA salt in synthesis. Experimental conditions: [TiF_4] = 0.8 mM (30 mL), 0.1 g of α-MoO_3 nanorods; at 200^{o}C for 3 h. After synthesis, the α-MoO_3 nanorods templates were dissolved in 1.0 M NaOH solution and washed with deionized water.