Supplementary Information

Enlarging {110} Exposed Facets of Anatase TiO_2 by the Synergistic Action of Capping Agents

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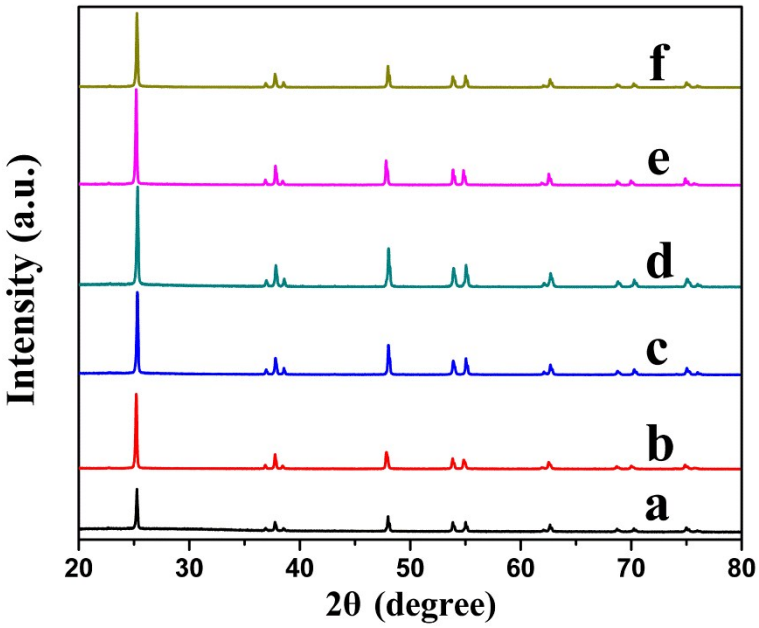

Fig. S1. XRD patterns of TiO_2 samples prepared in different concentrations of H_2O_2 solutions: (a) 0 M; (b) 0.6 M; (c) 0.9 M; (d) 1.5 M; (d) 2.4 M; (e) 3.0 M.

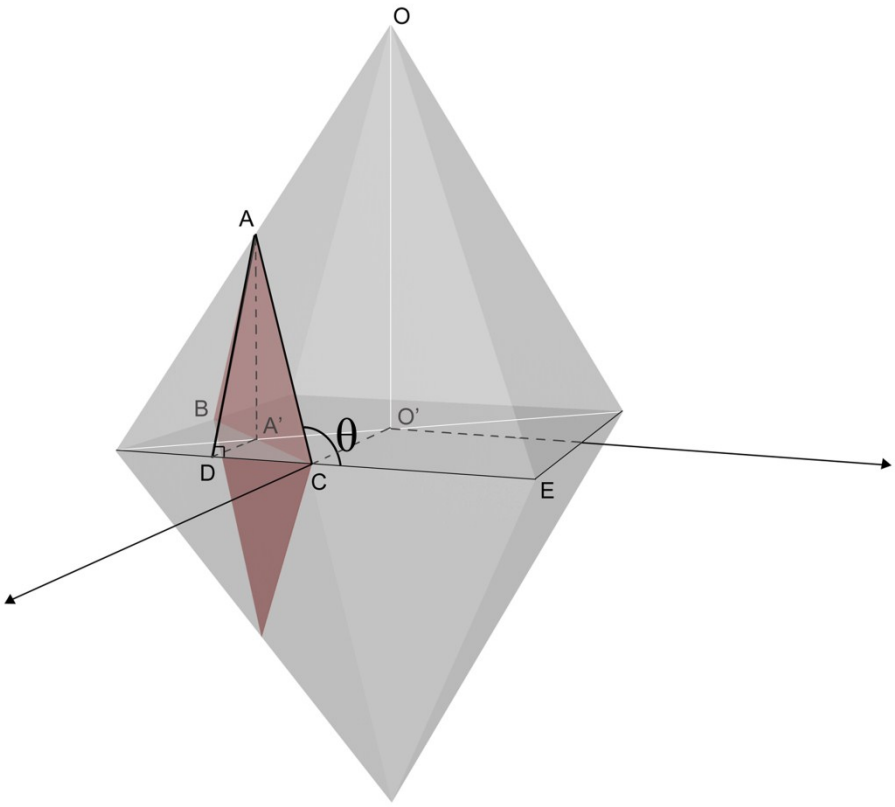

Fig. S2. Schematic diagram of the anatase TiO_2 single crystal.

Calculated θ angle

$$\theta = 180^{o} - \arccos\frac{DC}{AC}$$

Here we set O'C = 2a, O'G = 2b, OO' = 2c, a = b = 3.785, c = 9.514, A is the midpoint of line OE.

$$AC^2 = AA'^2 + A'C^2 = (\frac{OO'}{2})^2 + (A'D^2 + DC^2) = c^2 + (a^2 + b^2) = 119.168,$$

$$AC = 10.916,$$

$$DC = b = 3.785$$

$$\theta = 180^{o} - \arccos\frac{DC}{AC} = 180^{o} - \arccos\frac{3.785}{10.916} = 110^{o}.$$

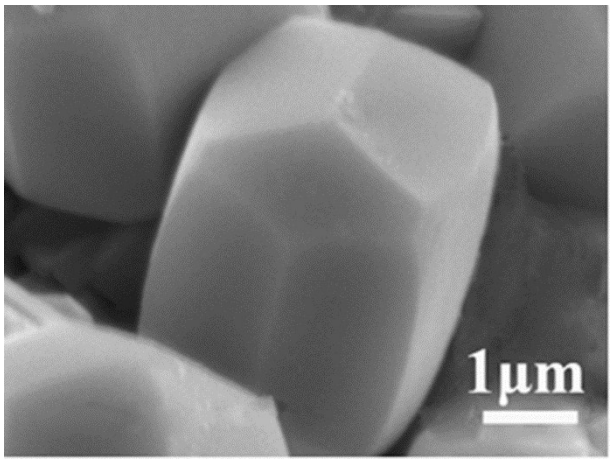

Fig. S3. SEM image of TiO_2 prepared by using $TiCl_4$ as Ti source in presence of H_2O_2 (2.4 M) and HF (0.1 M).

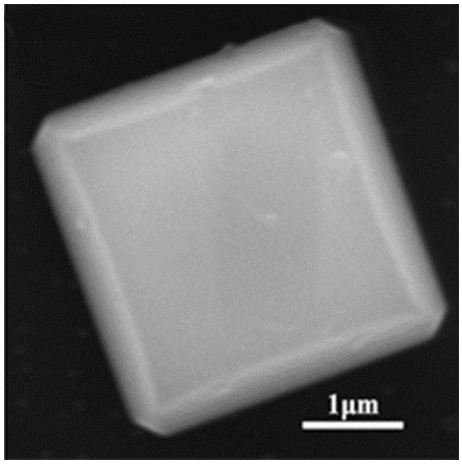

Fig. S4. SEM images of anatase TiO_2 single crystals prepared using Ti $(OC_3H_7\text{-}i)_4$ as titanium source in the presence of H_2O_2 (2.4 M) and HF (0.1 M).

Table S1. The dependence of exposed facets on titanium source, H_2O_2, HCl, and HF

	Composition of reaction solution				Exposed facets
	Titanium source	H_2O_2	HF	HCl	
A[a]	$TiCl_3$	Yes	No	No	Irregular particles
B[a]	$TiCl_3$	Yes	No	Yes	{101} and {001}
C[a]	$TiCl_3$	No	Yes	No	{101}, {001}, and minor {110}
D[a]	$TiCl_3$	Yes	Yes	No	{101}, {001}, and bigger {110}
E[a]	$Ti(OC_3H_7\text{-}i)_4$	Yes	Yes	No	{101}, {001}, and minor {110}
F[b]	TiF_4	No	Yes	No	{101} and {001}
G[c]	Ti powder	Yes	Yes	No	{101}, {001}, and minor {110}
H[d]	$TiCl_3$	No	Yes	No	{101}, {001}, and minor {110}
I[e]	$TiCl_3$	Yes	No	No	{101} and {001}

[a] This work.

[b] Nature, Nature 2008, 453, 638.

[c] *Chem. Commun.*, 2010, 46, 1664.

[d] *J. Phys. Chem. Lett.* 2013, 4, 3910.

[e] *Ind. Eng. Chem. Res.* 2013, 52, 6704.

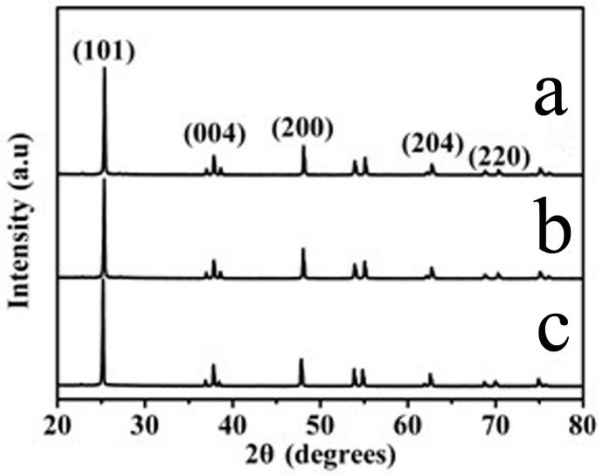

Fig. S5. XRD patterns of the {110} facet exposed TiO_2 single crystals calcined at different conditions: (a) Without calcination treatment; (b) Calcination at 600 ºC for 2 h; (c) Calcination at 800 ºC for 2 h.