Supporting Information

Low Temperature Solvothermal Synthesis of Anatase TiO_2 Single Crystals with Wholly {100} and {001} Faceted Surfaces

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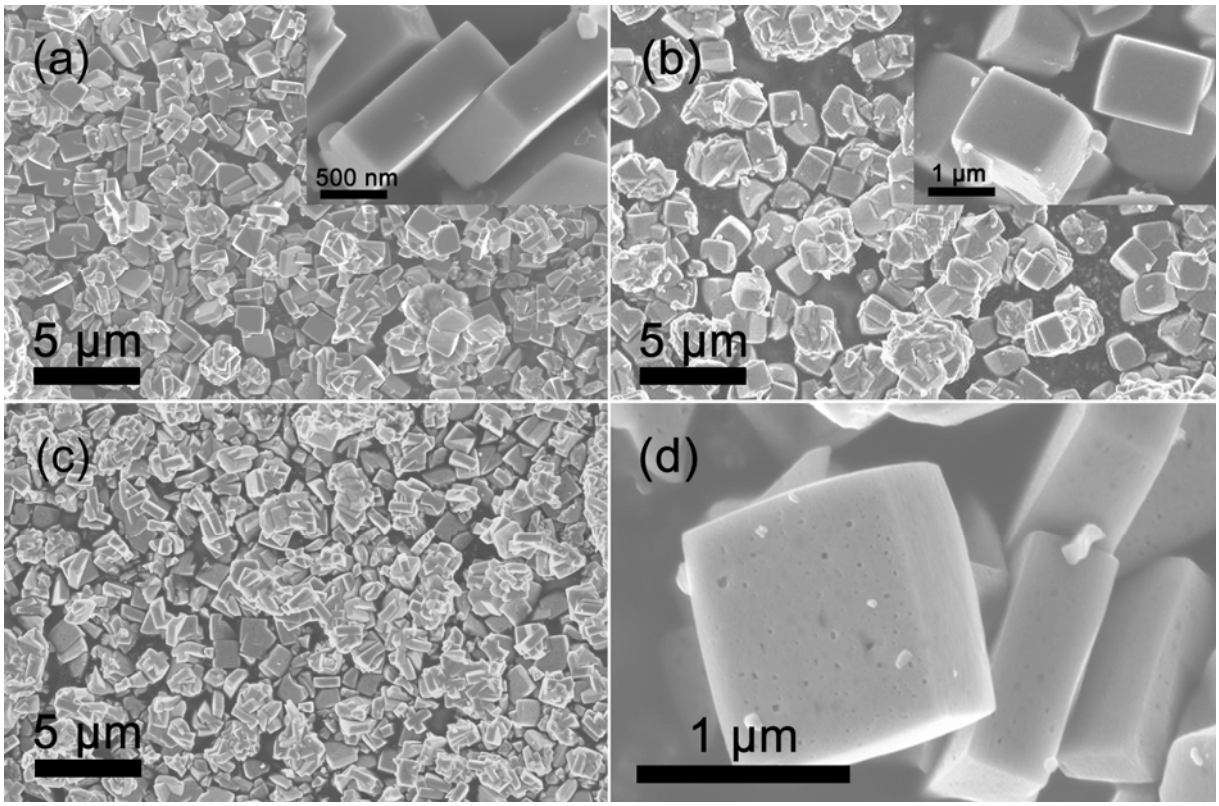

Figure S1. FESEM images of anatase TiO_2 single crystals: (a) MT-001 and (c) annealed at 600 ^{o}C for 2 h, (b) MT-100, (d) the high resolution FESEM of (c).

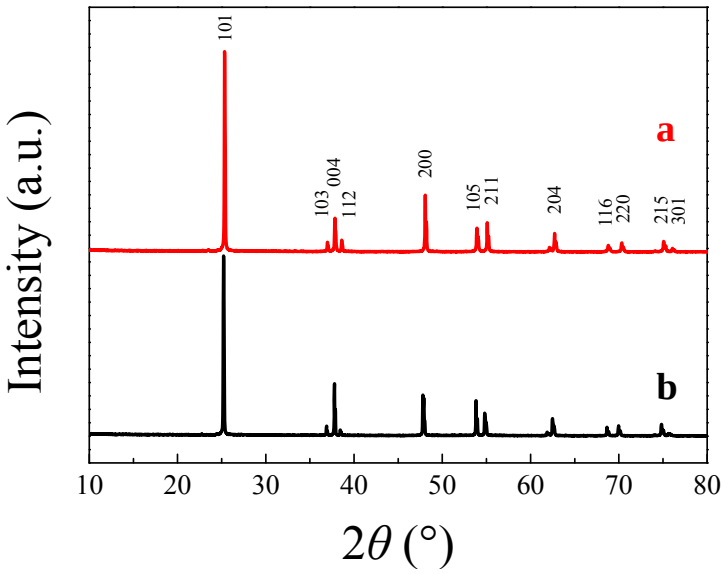

Figure S2. Representative XRD pattern of the as-synthesized anatase TiO_2 (MT-100): (a) before and (b) after 600 ^{o}C thermal treatment for 2 h.

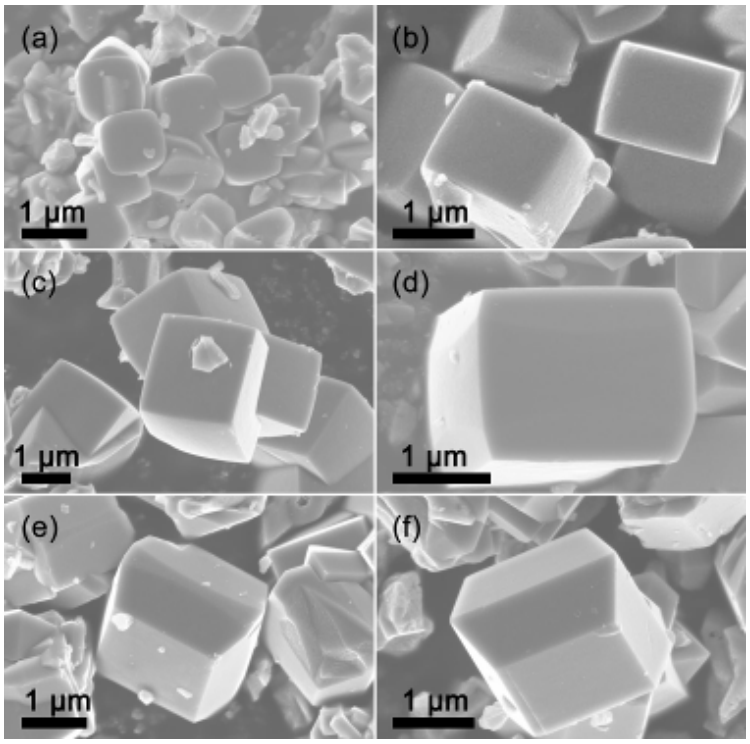

Figure S3. FESEM images of anatase TiO_2 single crystals synthesized in 1.2 M HCl with 0.0225 M $NaBF_4$ for 12 h at different temperatures: (a) 120, (b) 130, (c) 140, (d) 150, (e) 160 and (f) 170 ^oC.

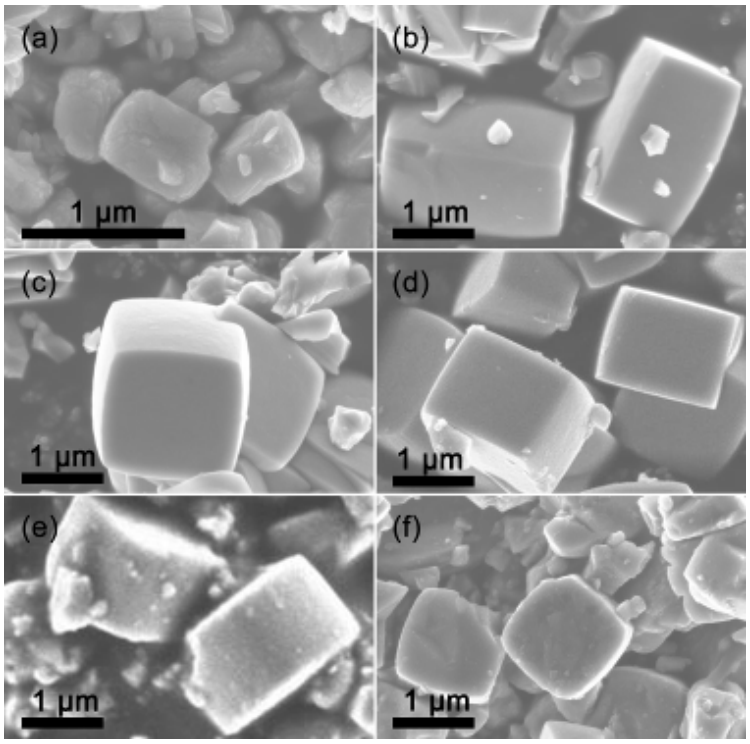

Figure S4. FESEM images of anatase TiO_2 single crystals synthesized in 1.2 M HCl at 130 ^oC for 12 h with different concentrations of $NaBF_4$: (a) 0 M, (b) 0.0075 M, (c) 0.0150 M, (d) 0.0225 M, (e) 0.0300 and (f) 0.0375 M.

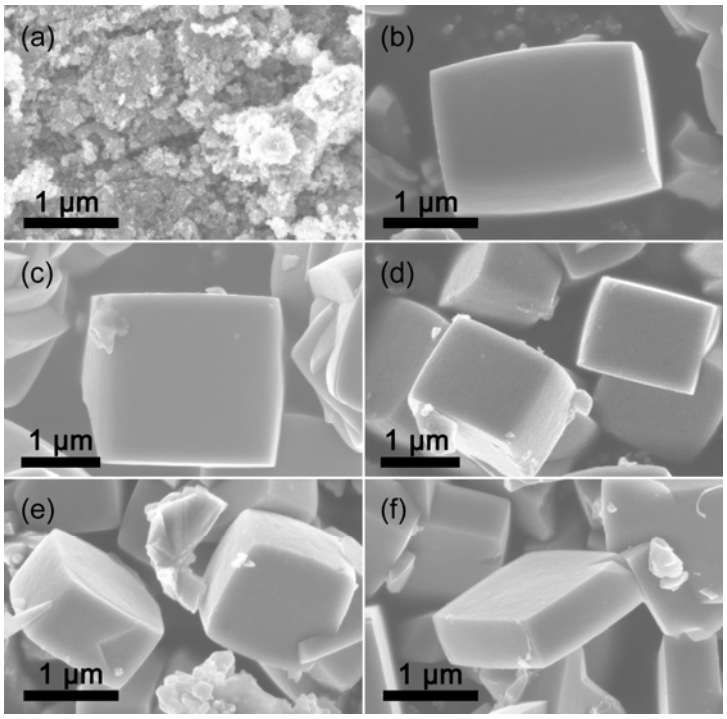

Figure S5. FESEM images of anatase TiO_2 single crystals synthesized at 130 ^oC with 0.0225 M $NaBF_4$ in different concentrations of HCl: (a) 0 M, (b) 0.5 M, (c) 1.0 M, (d) 1.2 M, (e) 1.5 M and (f) 2.0 M.

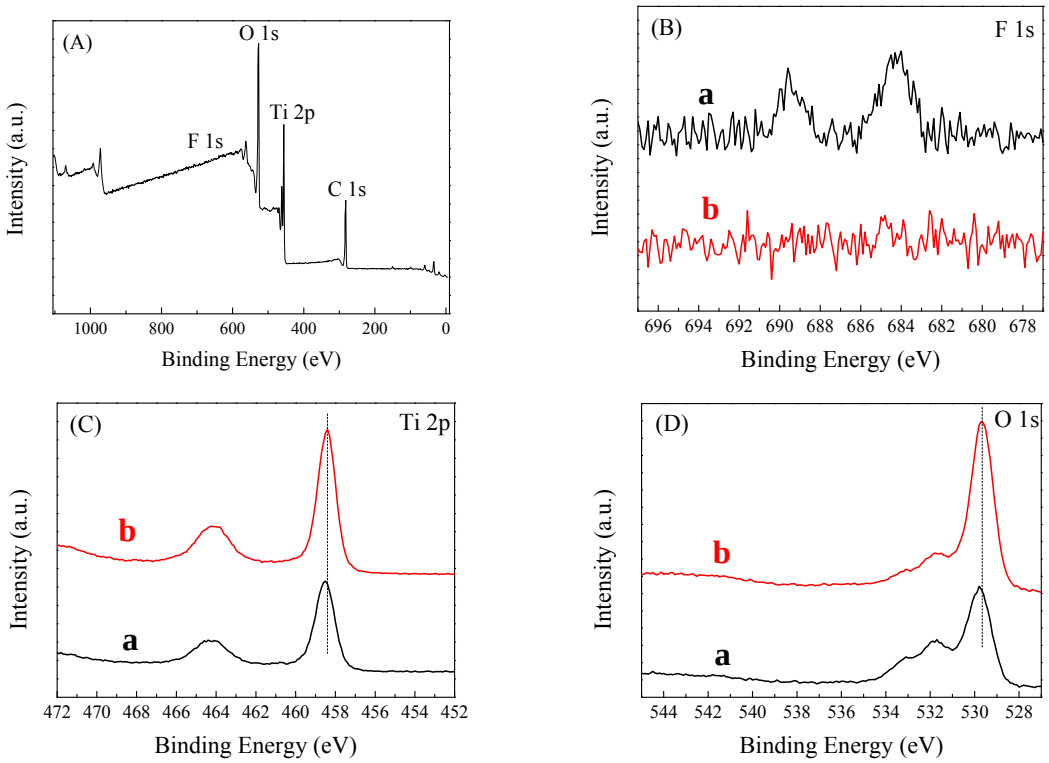

Figure S6. XPS of the as-prepared anatase TiO_2 particles (MT-100): (A) the survey, (B) F 1s, (C) Ti 2p, (D) O 1s. (a) without annealing treatment, (b) annealed at 600 ^oC for 2 h.

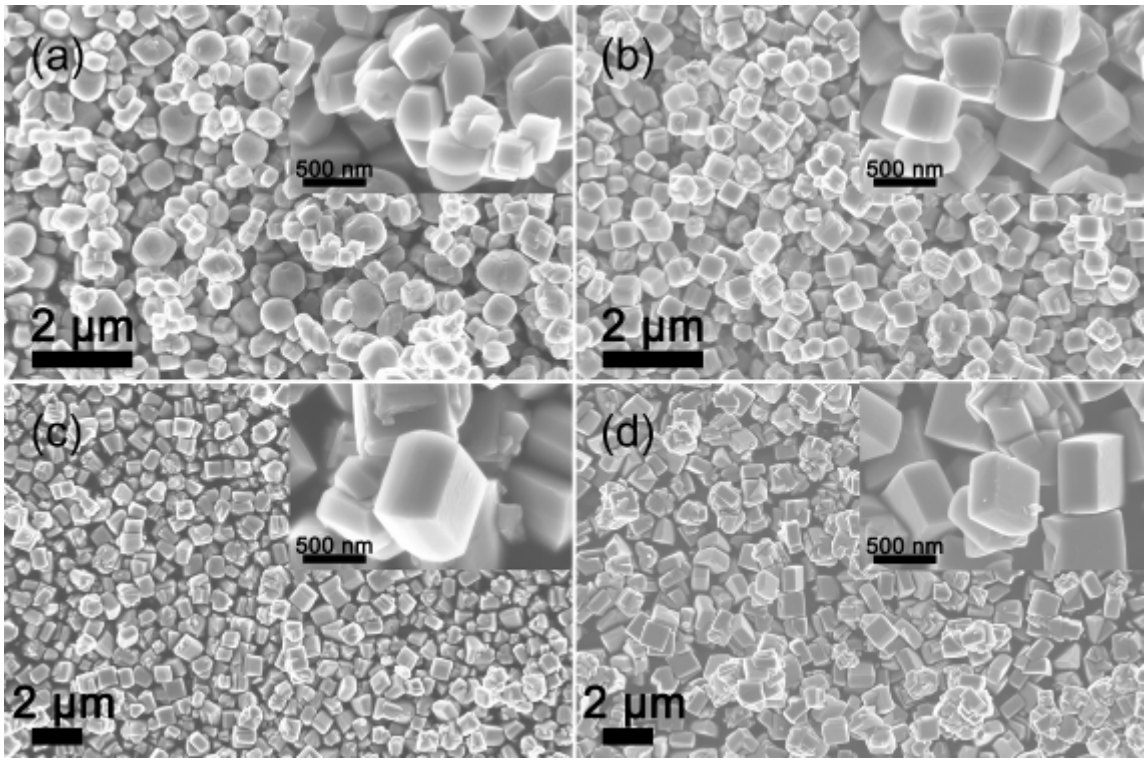

Figure S7. FESEM images of TiO_2 synthesized at 140 ^{o}C in 2 M HCl solution for 12 h with different concentrations of NaF: (a) 0.015 M, (b) 0.030 M, (c) 0.045 M and (d) 0.060 M. The insets of (a), (b), (c) and (d) are the corresponding high resolution FESEM images.

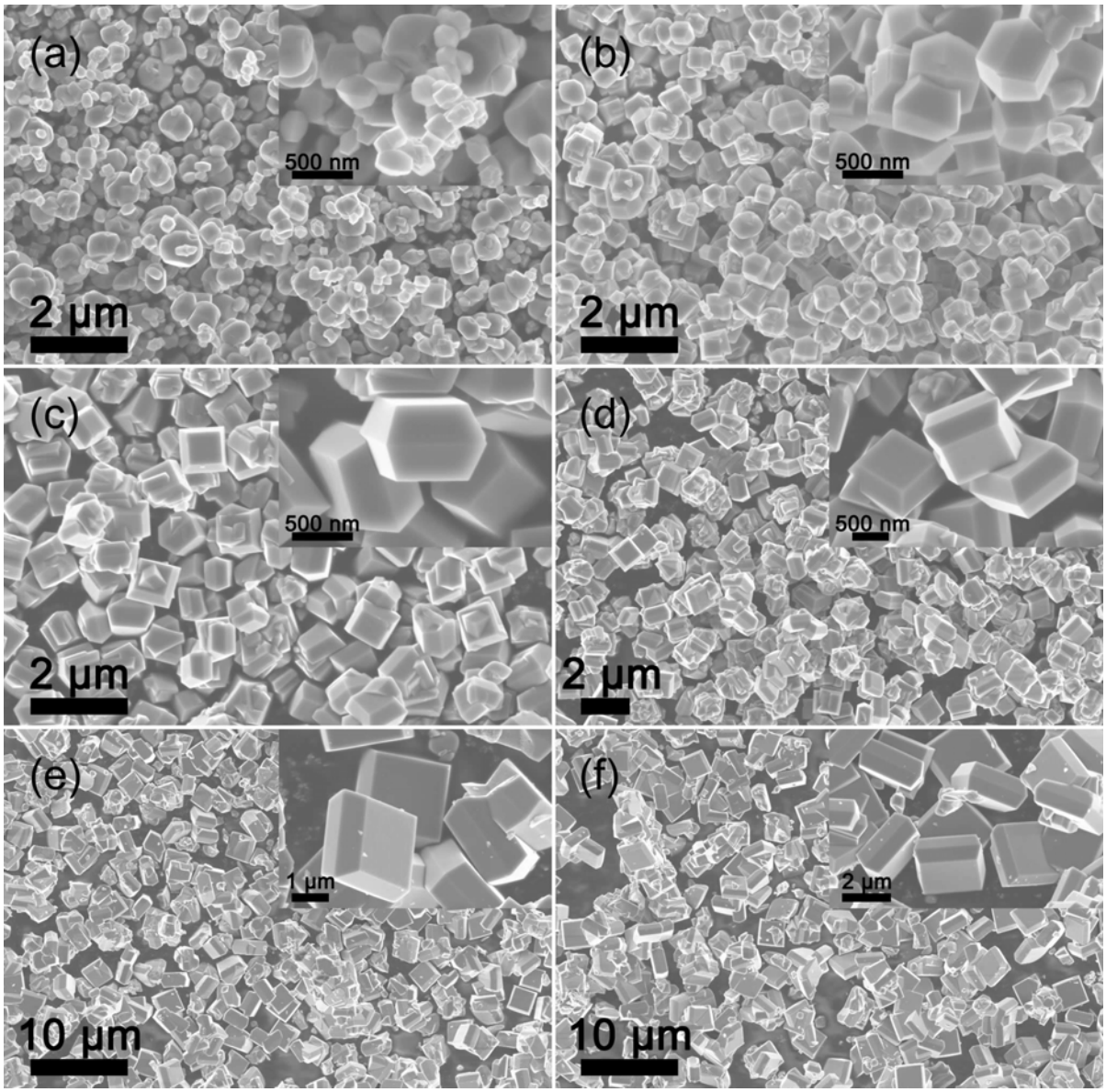

Figure S8. FESEM images of TiO_2 synthesized at 160 ^{o}C in 2 M HCl solution for 12 h with different concentrations of NaF: (a) 0.015 M, (b) 0.030 M, (c) 0.045 M, (d) 0.060 M, (e) 0.075 M and (d) 0.090 M. The insets of (a), (b), (c), (d) (e) and (f) are the corresponding high resolution FESEM images.

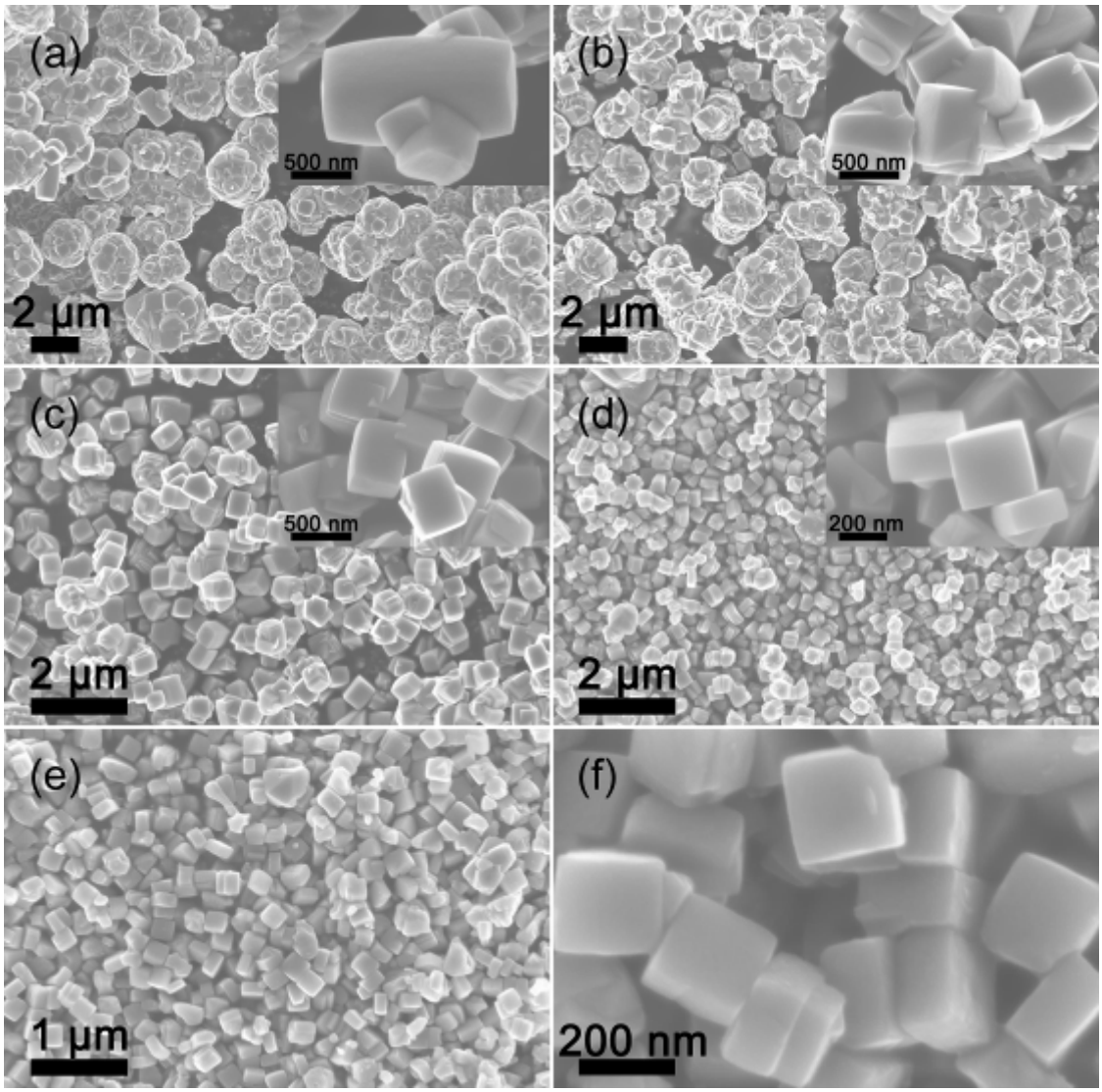

Figure S9. FESEM images of TiO_2 synthesized at 120 ^{o}C for 12 h with 0.030 M NaF in different concentrations of HCl solution: (a) 0.5 M, (b) 1.0 M, (c) 1.5 M, (d) 2.0 M and (e) 2.5 M. The insets of (a), (b), (c) and (d) are the corresponding high resolution FESEM images and (f) is the high resolution FESEM image of (e).

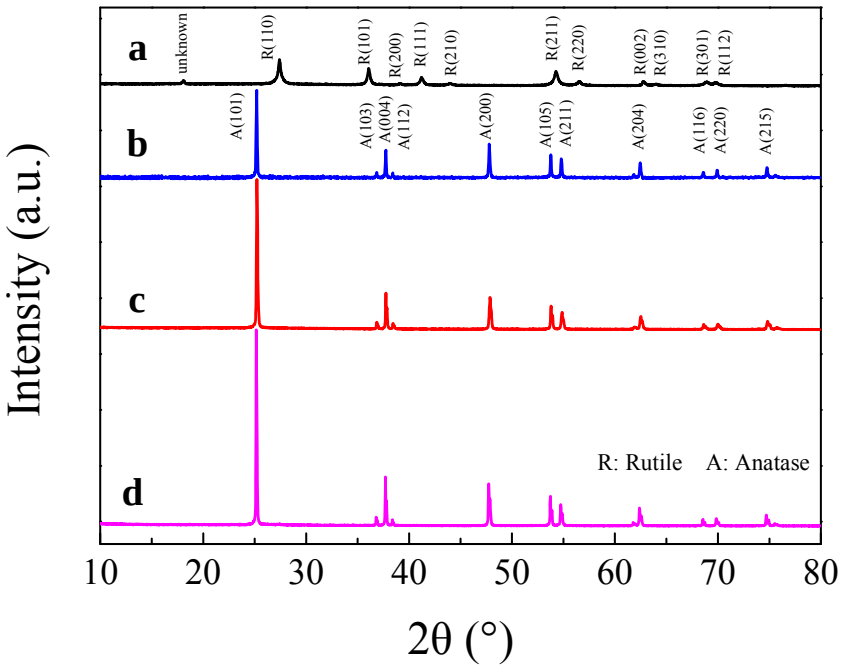

Figure S10. Representative XRD pattern of the as-synthesized anatase TiO_2 with NaF: (a) without NaF, (b) NT-001, (c) NT-100 and (d) NT-101.

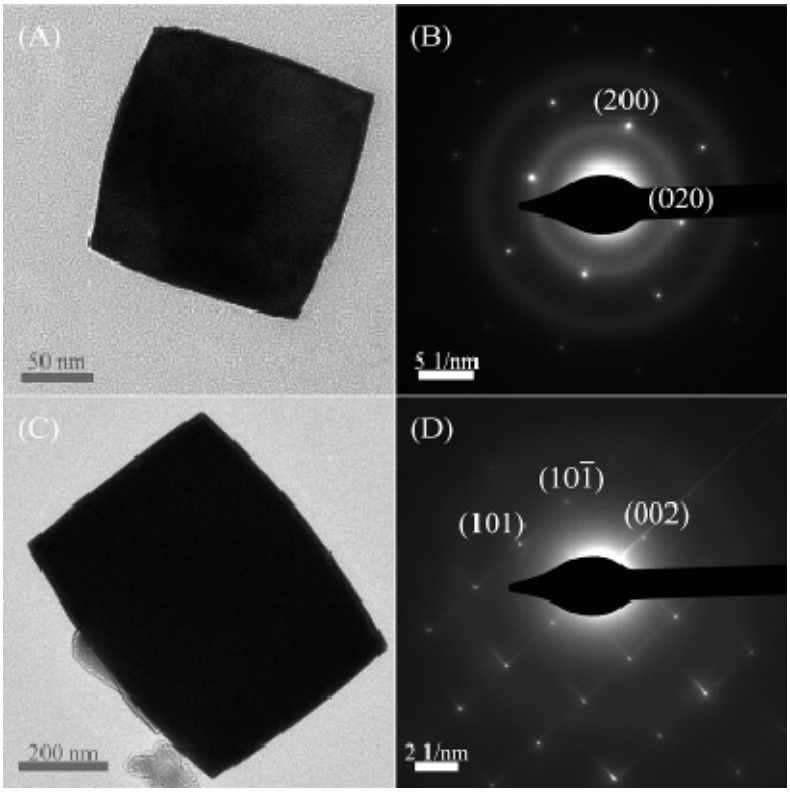

Figure S11. TEM images of anatase TiO_2 crystals synthesized with NaF: (A) NT-001 and (C) NT-100. (B) and (D) are the selected area electron diffraction (SAED) patterns of (A) and (C), respectively.

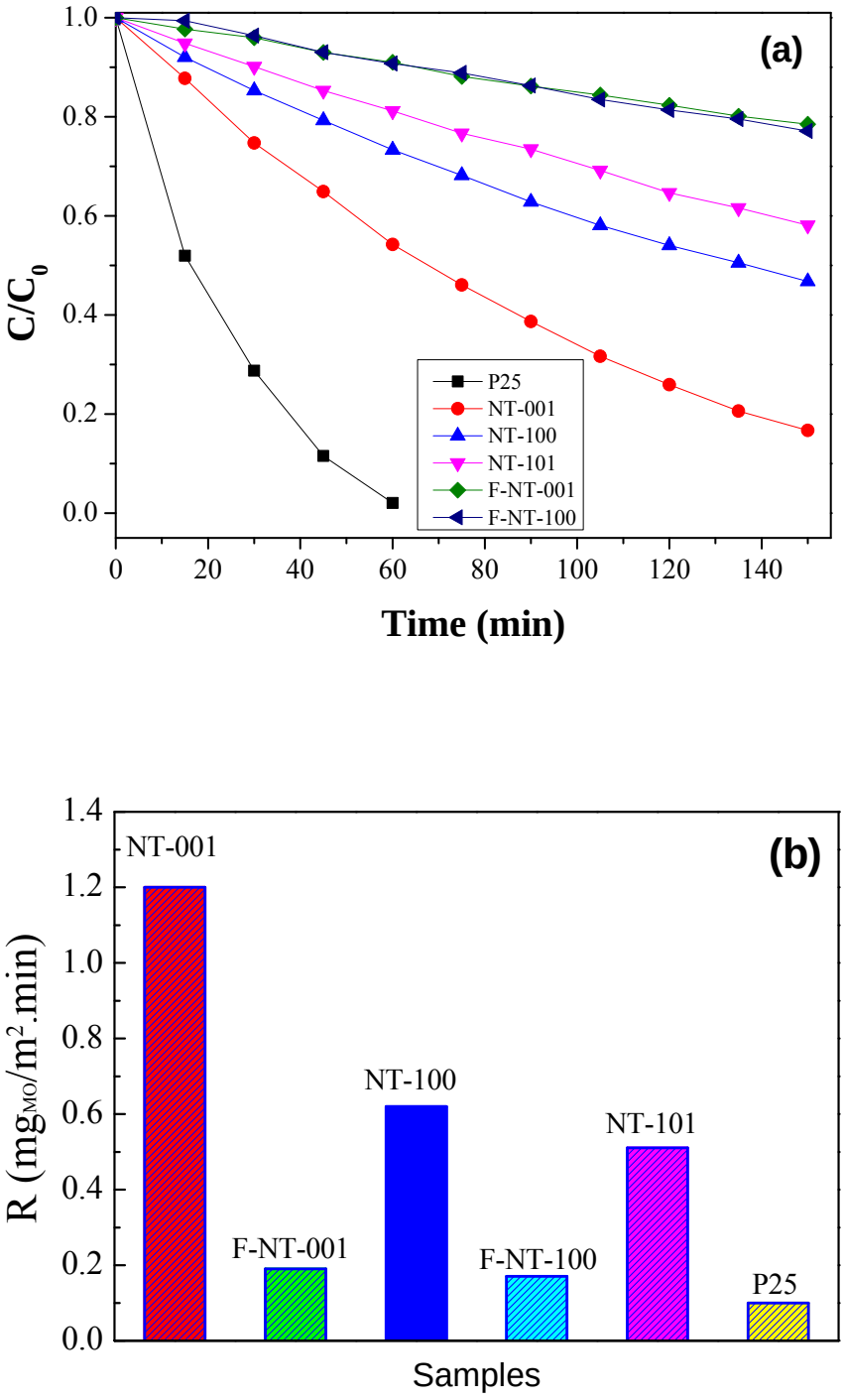

Figure S12. (a) The photocatalytic decomposition curves of MO on different samples, the catalyst amount of 0.1g/L and MO concentration of 20 mg/L; (b) the normalized photocatalytic activity (R) for MO decomposition per unit surface area with different photocatalysts after 30 min light irradiation(mg_{MO}/m^2.min).