Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supporting Information

Mechanical force-assisted modulation of TiO_2 nanowires-entangled hierarchical microstructures for photocatalysis application

Zeju Zhang[a], Lili Chen[a], Yanhui Zhao[a,*], Jielei Huang[a], Chenfeng Ding[b,c], Chunlei Liu[a], Yaochun Liu[c], Xiaofen Hong[d], Yuan Liu[a,c,*] and Chunzhao Liu[a,*]

[a]*State Key Laboratory of Bio-fibers and Eco-textiles, Institute of Biochemical Engineering, The Affiliated Qingdao Central Hospital of Qingdao University, College of Materials Science and Engineering, Qingdao University, Qingdao 266071, P.R. China*

**E-mail: 19341063@qq.com, liuyuan@qdu.edu.cn, czliu@qdu.edu.cn*

[b]*Energy Materials and Surface Sciences Unit (EMSSU), Okinawa Institute of Science and Technology Graduate University (OIST), 1919-1 Tancha Kunigami-gun, Onna-son, Okinawa 904-0495, Japan*

[c]*Foshan (Southern China) Institute for New Materials, Foshan 528200, P.R. China*

[d]*Zhejiang Rich Environmental Protection Technology Co., Ltd., Hangzhou 310000, P.R. China*

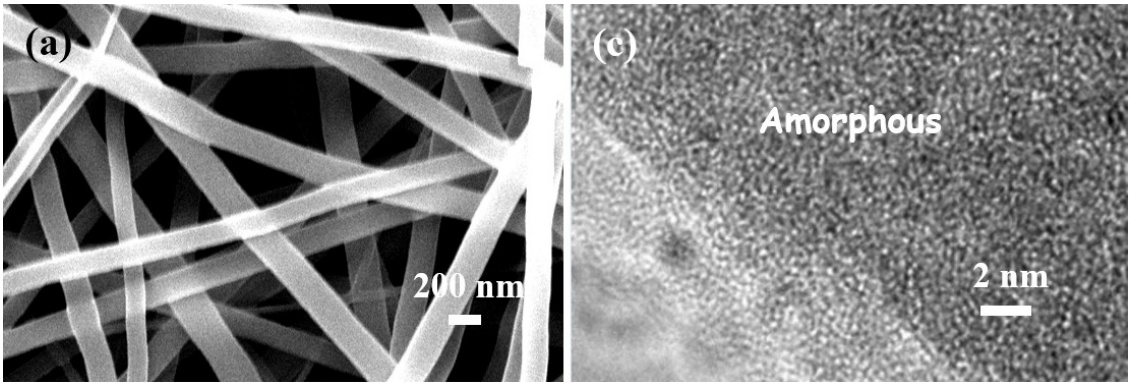

Fig. S1 (a) SEM and (b) HR-TEM images of amorphous titania-silica submicron fibers.

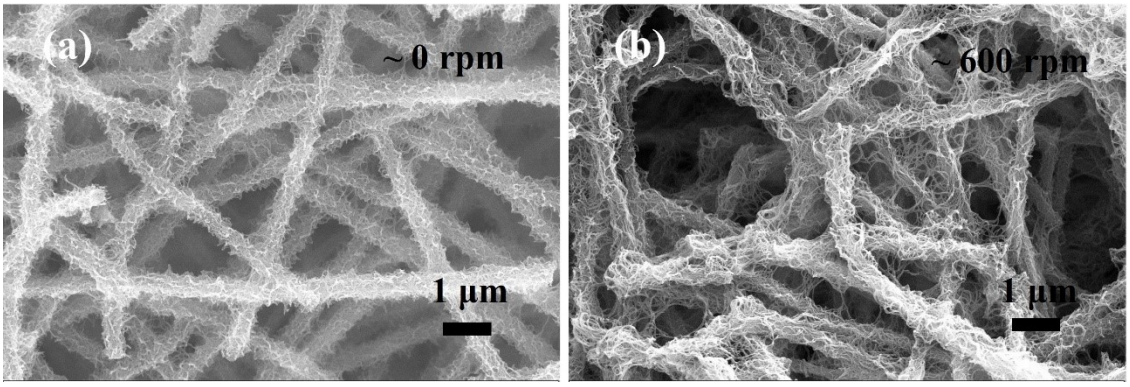

Fig. S2 SEM images of as-prepared HTO-entangled hierarchical nano-/micro-structures after different stirring conditions with the stirring rates of (a) 0 rpm, and (b) 600 rpm.

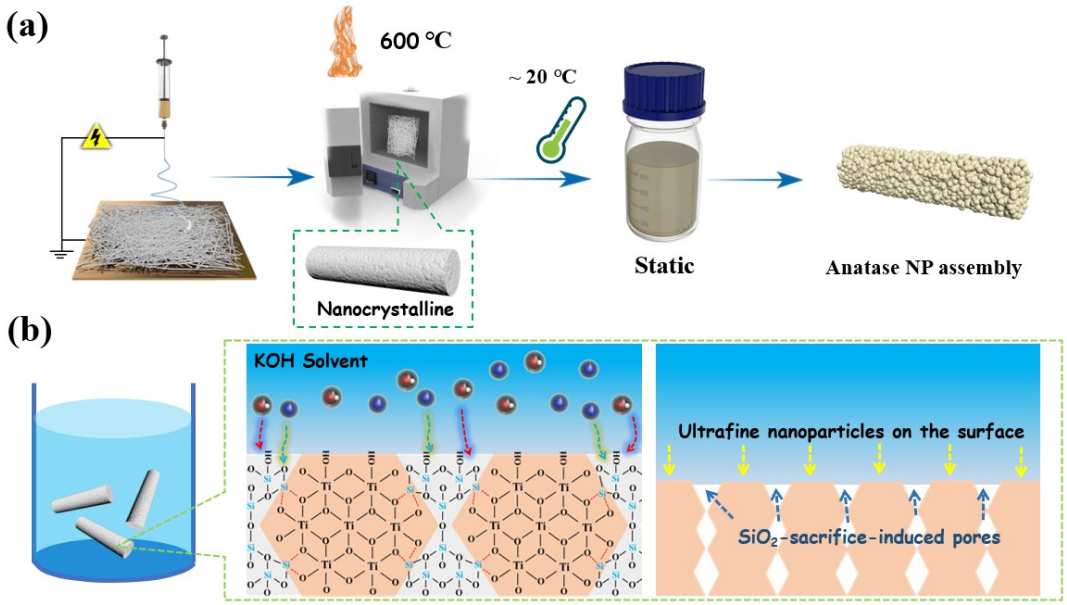

Fig. S3 (a) Schematic exhibition for the design of porous TiO_2 submicron fibers with ultrafine TiO_2 nanocrystals; (b) schematical illustration of the formation of pores in the pristine fibers.

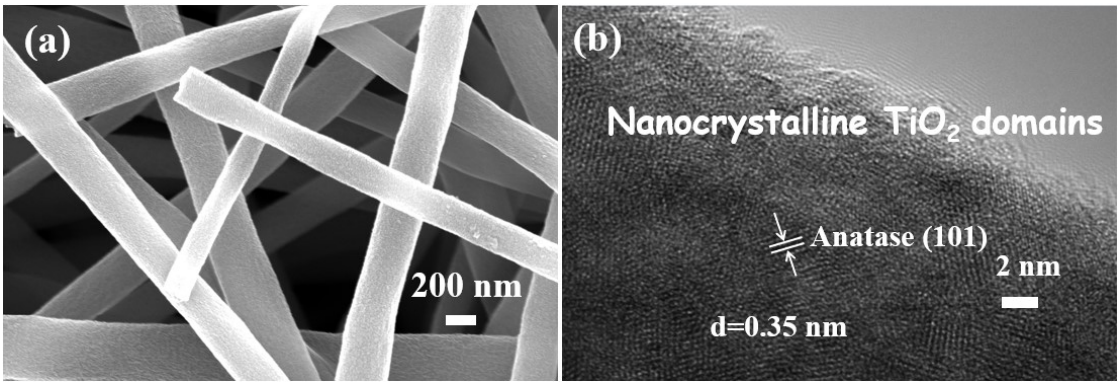

Fig. S4 (a) SEM and (b) HR-TEM images of crystalline titania-silica submicron fibers.

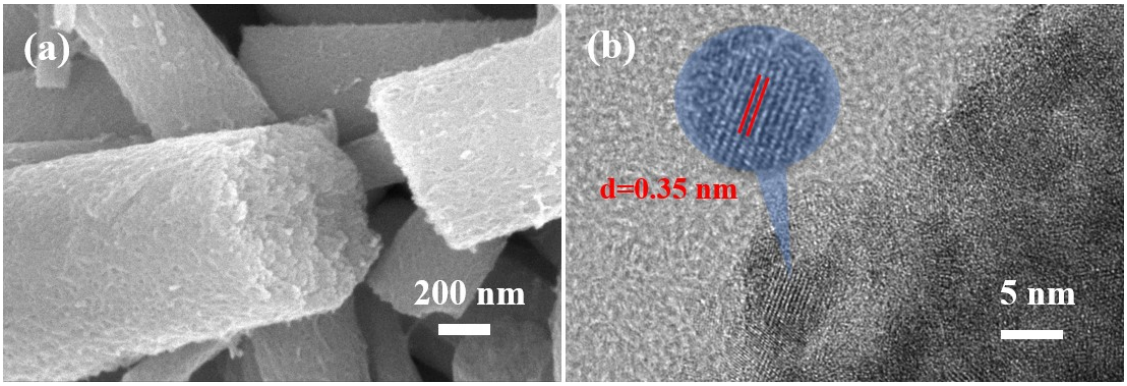

Fig. S5 (a) SEM and (b) HR-TEM images of porous TiO_2 submicron fibers.

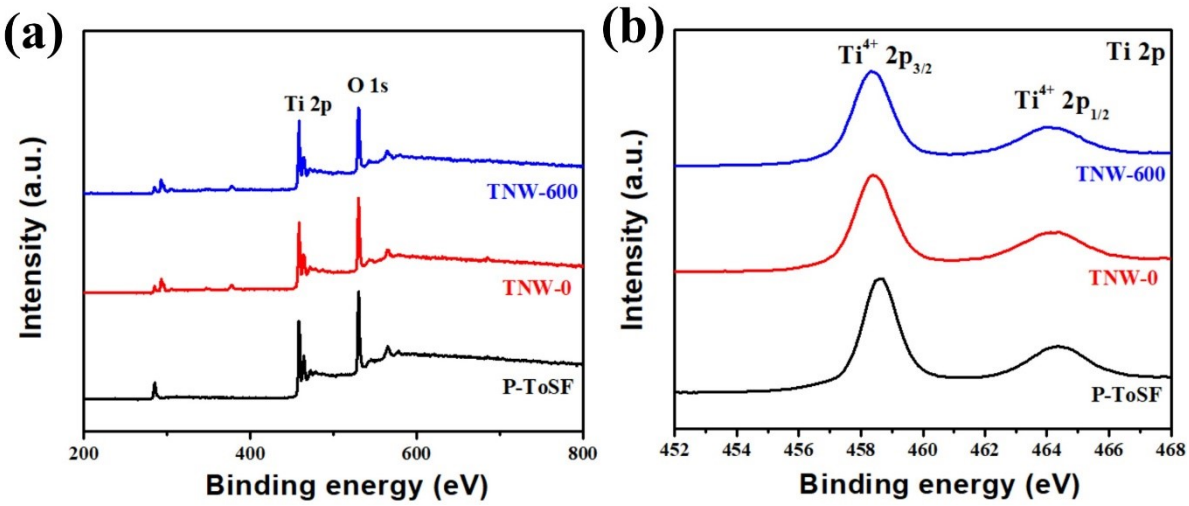

Fig. S6 (a) XPS general spectra of as-prepared TiO_2 samples; (b) XPS high-resolution spectra of Ti 2p region.

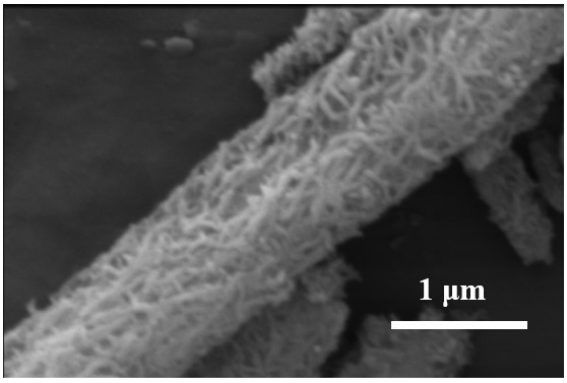

Fig. S7 SEM image of TNW-600 after photocatalysis process.

Table S1 Comparing the photocatalytic activity and as-needed synthesis condition of TNW-600 with selected works in detail.

Samples	Methods	BET $m^2 g^{-1}$	C_{Dye}:$Wt_{Catalyst}$ (mol:g)	Light source	Degradation vs. time	Rate constants (min^{-1})	Ref.
TNW-600	Room-temperature solution-based method, 20℃ (12h)	184	2×10^{-5} : 1	300 W Xe	94% (30min)	0.092	This work
Porous TiO_2 hollow aggregates	Hydrothermal NH_4F, water 160℃ (6h)	168	3.3×10^{-5} : 1	UV (254nm)	100% (50min)	0.086	S1
TiO_2 nanobelts	Hydrothermal 10M NaOH aqueous solution 200℃ (24h)	16.8	4×10^{-5} : 1	20 W Hg	80% (60min)	0.022	S2
Anatase TiO_2 nanoparticles	Hydrothermal aetylaceton, ethanol, urea 150℃ (18h)	Not available	1×10^{-5} : 1	UV (254nm)	99% (150min)	0.023	S3
TiO_2 -B nanowires	Hydrothermal 10M NaOH aqueous solution 170℃ (48h)	48.75	2×10^{-5} : 1	400 W UV	96% (60min)	0.058	S4
Anatase TiO_2 nanowires	Hydrothermal lithium acetate dihydrate DMF, HAc 200℃ (20h)	72.2	5×10^{-5} : 1	UV (365nm)	95% (50min)	0.057	S5

Hollow TiO_2 spheres	Solvothermal n-PrOH, water 180℃ (12h)	35	1×10^{-5}：1	300 W Xe	98% (40min)	0.064	S6
TiO_2 nanofibers	Hydrothermal hydrochloric acid, water, 150℃ (3h)	Not available	1×10^{-4}：1	UV (366nm)	96% (140min)	0.024	S7
TiO_2 microspheres	Hydrothermal 10M NaOH aqueous solution, 150℃ (24h)	215.8	4×10^{-5}：1	300 W Xe	100% (30min)	0.136	S8

Reference：

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