

Fabrication and Photocatalytic Activity of Single Crystalline TiO₂ Hierarchically Structured Microspheres

Haisheng Huang ^{1,2}, Qi Kong ^{1,2}, Xin Yue ^{1,2}, Kunlei Wang ³, Zhishun Wei ^{1,2,4,*} and Ying Chang ^{1,2,4,*}

¹ Hubei Provincial Key Laboratory of Green Materials for Light Industry, New Materials and Green Manufacturing Talent Introduction and Innovation Demonstration Base, Hubei University of Technology, Wuhan 430068, China

² School of Materials and Chemical Engineering, Hubei University of Technology, Wuhan 430068, China

³ Institute for Catalysis, Hokkaido University, Sapporo 001-0021, Japan

⁴ Hubei Longzhong Laboratory, Xiangyang 441000, China

* Correspondence: wei.zhishun@hbut.edu.cn (Z.W.); cy0025@hbut.edu.cn (Y.C.)

Table S1. Comparison of TiO₂ photocatalytic activity in different literatures.

Ti Source	Morphology Regulator	Morphology	Contaminant	BET(m ² /g)	Degradation Rate(%)	Cite
TiF ₄	HF	Particle	\	\	\	[18]
Titanium(IV) isopropoxide	Diethylenetriamine (DETA)	Microsphere	Methylene Blue (10.0 mg/L)	93.5	~99.0	[38]
Ti powder	HF+H ₂ O ₂	Particle	MB	\	82.5	[22]
P25(TiO ₂)	HF+H ₂ O ₂	Particle	MB (25.0 mg/L)	6.1	~99.0	[21]
Tetrabutyl titanate(TBT)	Acetic acid+NH ₄ F	Particle	MB (6.4 mg/L)	30.0	97.5	[33]
Ti foil	HF	Microsphere	Dimethyl phthalate	\	94.3	[27]
Ti(SO ₄) ₂	NH ₄ F+H ₂ O ₂	Hollow microsphere	Brilliant red X-3B (61.5 mg/L)	\	\	[41]
TBT	HF	Particle	Phenol (5.0 mg/L)	\	\	[42]

Table S2. Crystallinity of different sample.

Sample	Calculated Area (total)	Area Peak1	Area Peak2	Area Peak3	Relative Crystallinity
T1	460.24	299.55	60.04	100.65	46%
T2	660.25	484.85	71.83	103.57	66%
T3	751.82	566.14	76.69	108.99	75%
T4	691.92	515.00	59.58	117.34	69%

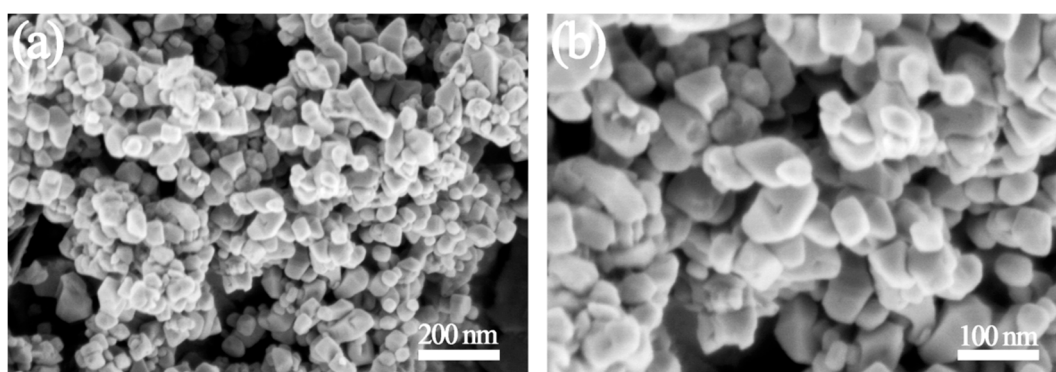


Figure S1. Higher magnification SEM image of T1.

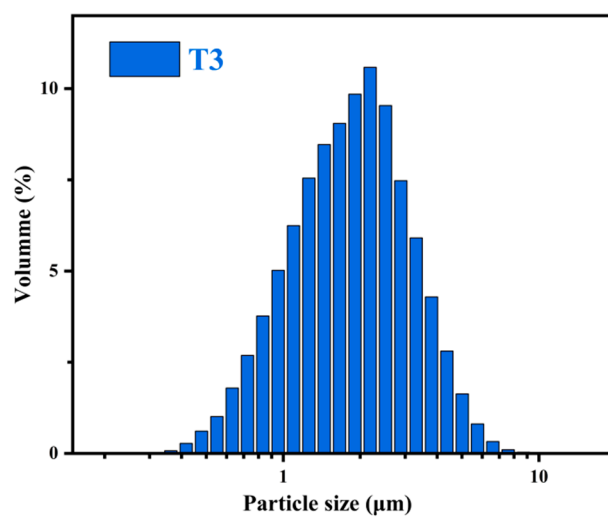


Figure S2. Particle size of microspheres.

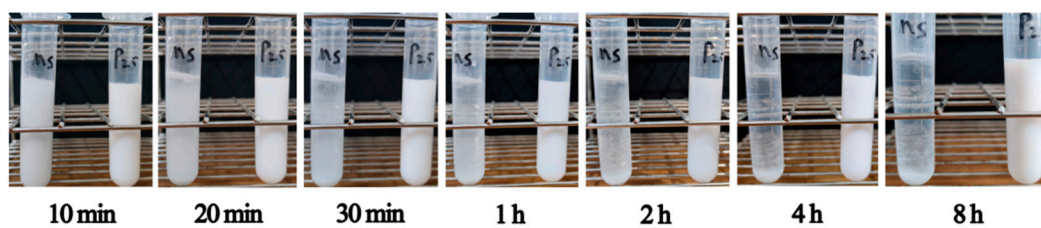


Figure S3. Precipitation time of microspheres (MS) and P25.