

Supporting Information

Fabrication of TiO₂/Fe₂O₃ core/shell nanostructure by pulse laser deposition toward stable and visible light photoelectrochemical water splitting

Hao Lu,^{a*} Song Fang,^a Jundie Hu,^a Bo Chen,^a Run Zhao,^a Huishu Li,^e Chang Ming Li^{a,b,c,d*} and Jinhua Ye^f

a: Institute of Materials Science & Devices, Suzhou University of Science and Technology, Suzhou, 215009, China.

b: Jiangsu Key Laboratory of Micro and Nano Heat Fluid Flow Technology and Energy Application, School of Environmental Science and Engineering, Suzhou University of Science and Technology, Suzhou 215009, China.

c: Institute of Advanced Cross-field Science and College of Life Science, Qingdao University, Qingdao, Qingdao 200671, P.R. China.

d: Institute for Clean Energy & Advanced Materials, Southwest University, Chongqing, 400715 P. R. China.

e: Center for Soft Condensed Matter Physics & Interdisciplinary Research, College of Physics, Optoelectronics and Energy, Soochow University, Suzhou 215006, China.

f: International Center for Materials Nanoarchitectonics (WPI-MANA), National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba, Ibaraki 305-0044, Japan.

Email: ecmli@swu.edu.cn, luhaoshaobo@163.com

*Corresponding author

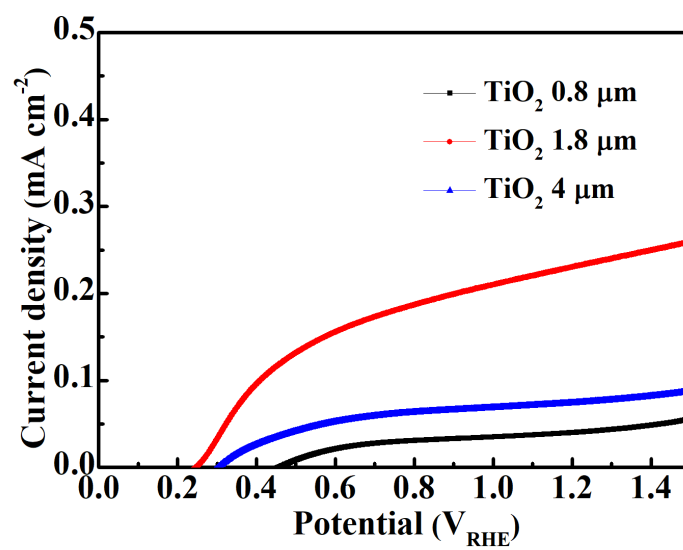


Figure S1 *J-V* curves of different TiO₂ length.

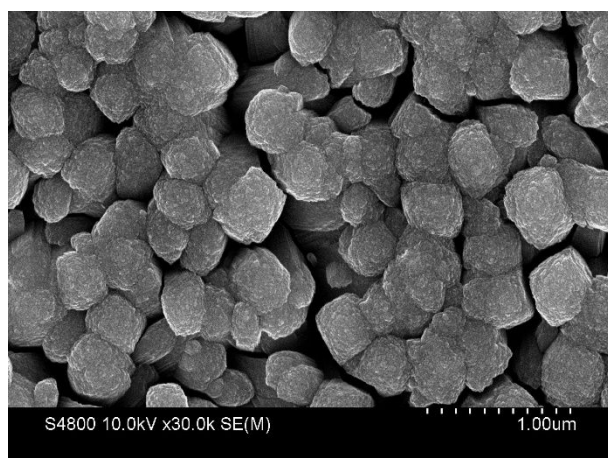


Figure S2 SEM image of 30 min deposited sample.

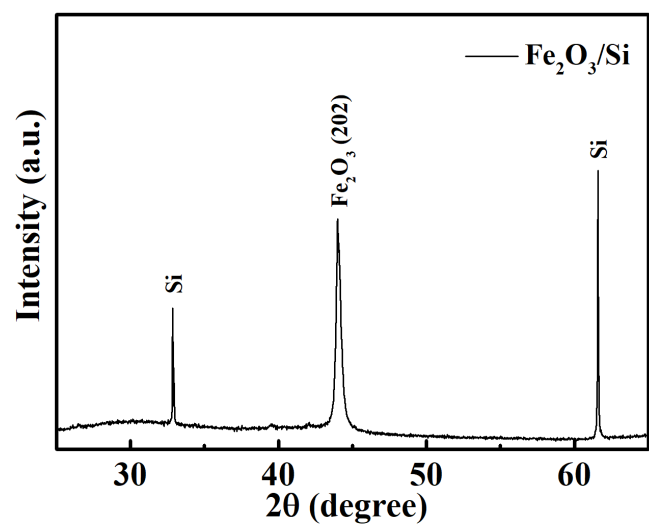


Figure S3 XRD pattern of 7 min Fe₂O₃/Si sample.

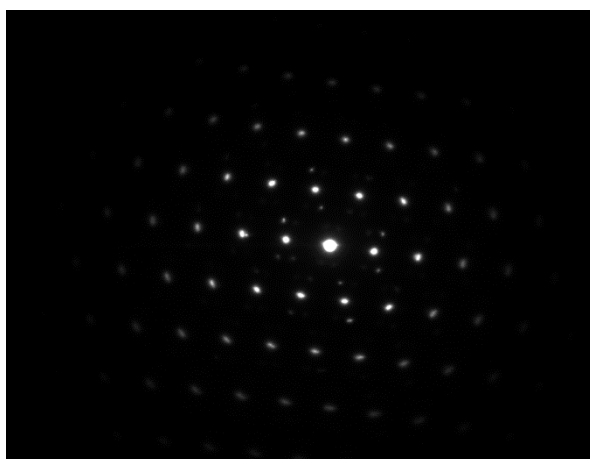


Figure S4 SEAD image of TiO₂/Fe₂O₃ core/shell sample.

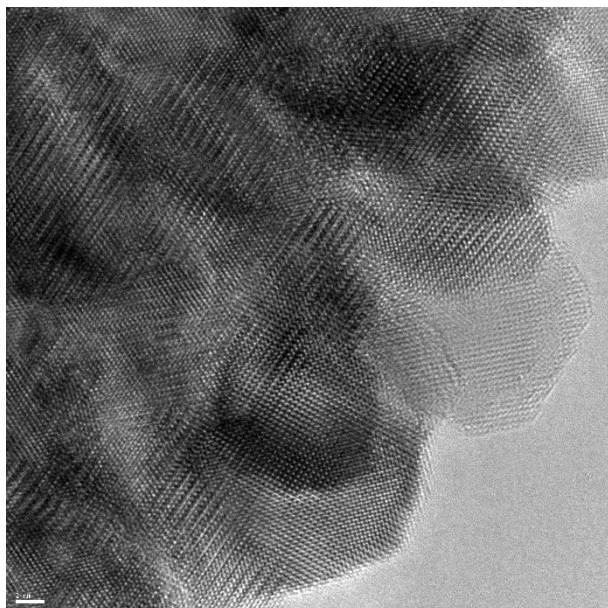


Figure S5 TEM image of larger scale 7 min Fe₂O₃ sample.

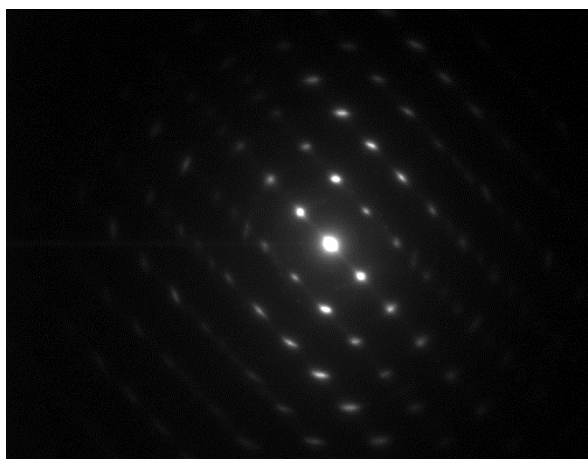
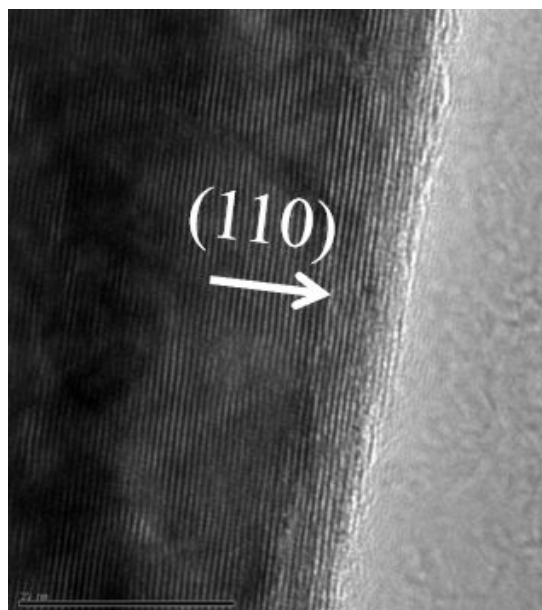


Figure S6 TEM and SEAD images of plain-TiO₂ sample.

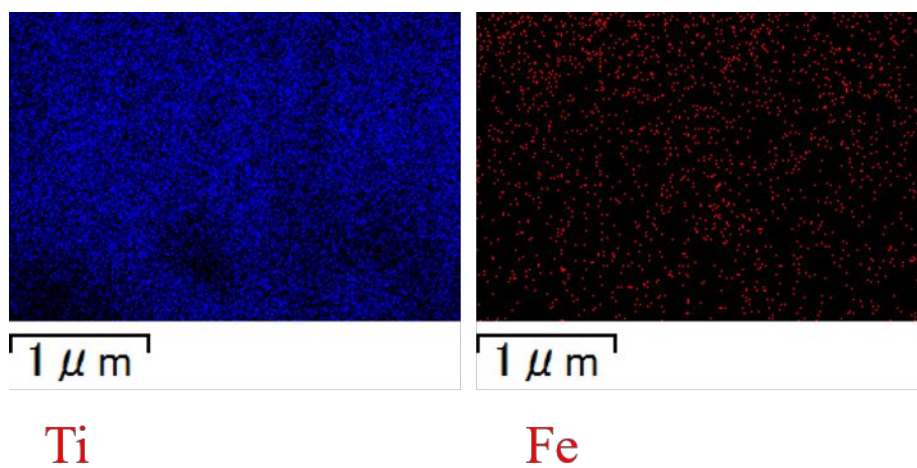


Figure S7 SEM EDAX mapping of TiO₂/7 min Fe₂O₃ sample.

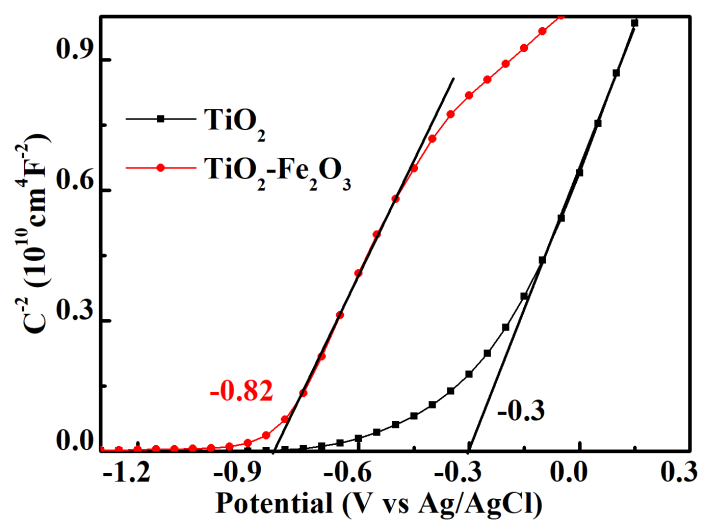


Figure S8 M-S curves of TiO_2 and $\text{TiO}_2/7 \text{ min Fe}_2\text{O}_3$ samples.

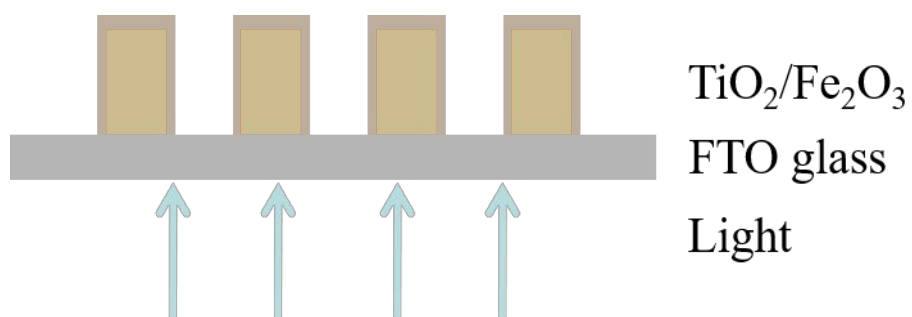


Figure S9 Schematic illustration of photoanodes with the order of light source/FTO/ $\text{TiO}_2/\text{Fe}_2\text{O}_3$.

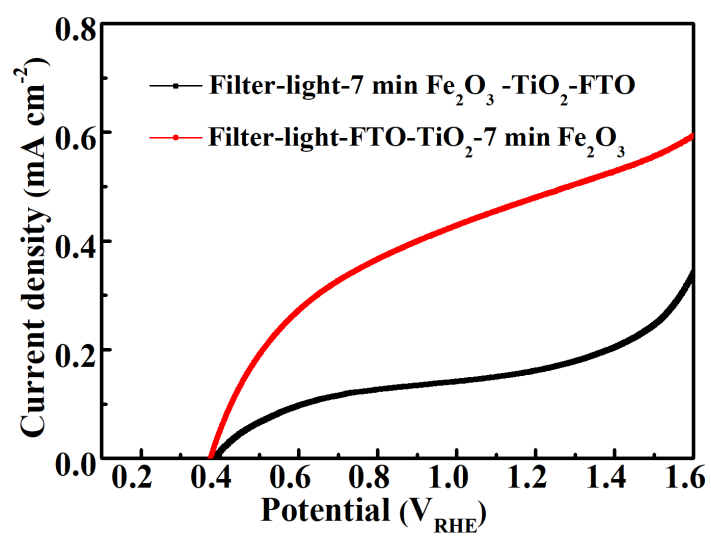


Figure S10 *J-V* curves of different side samples with 400 nm filter.

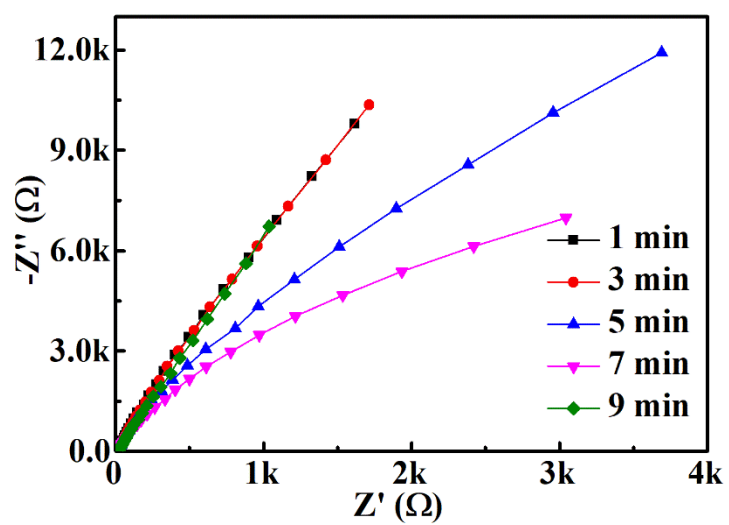


Figure S11 Nyquist plots of different deposited Fe_2O_3 time.

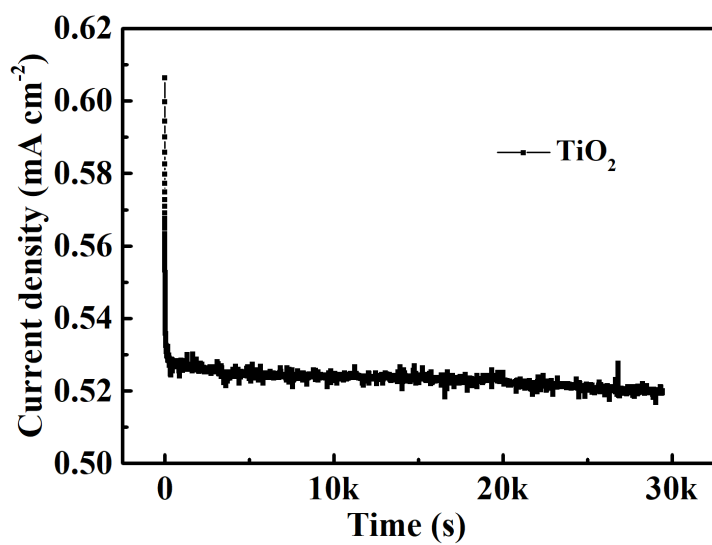


Figure S12 Long time measurement of TiO₂ sample.

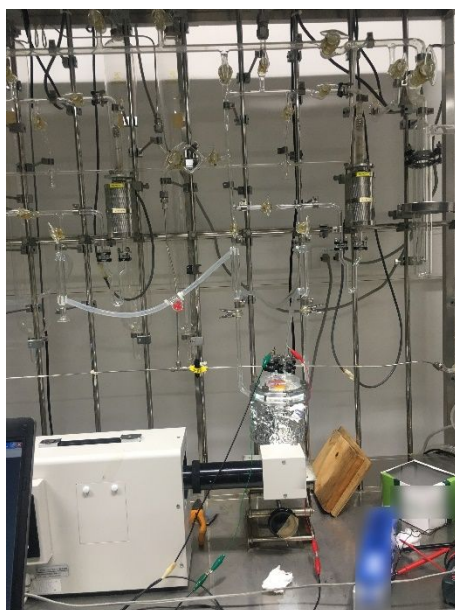


Figure S13 The photo of gasses collection and detection system in our lab(Photograph courtesy of Hao Lu).

Element	App Conc.	Intensity Corrn.	Weight%	Weight% Sigma	Atomic%
O K	0.26	0.9478	48.17	0.46	74.04
Ti K	0.22	0.8661	42.96	0.42	22.06
Fe L	0.02	0.3382	8.87	0.72	3.91
Totals			100.00		

Table S1 All elements analyzed (Normalized) of TiO₂/Fe₂O₃ sample.