Electronic supplementary information

Three-dimensional hierarchical TiO_2 urchin as photoelectrochemical anode with omnidirectional anti-reflectance properties

Weina Ren[1], Haifeng Zhang[1], Dezhi Kong[1], Bo Liu[1], Yaping Yang[1], Chuanwei Cheng[1, 2]*

[1]*MOE Key Laboratory of Advanced Micro-structured Materials, School of Physics Science and Engineering, Tongji University, Shanghai 200092, P.R. China*

[2]*National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, Shanghai 200083, P. R.China*

E-mail: cwcheng@tongji.edu.cn

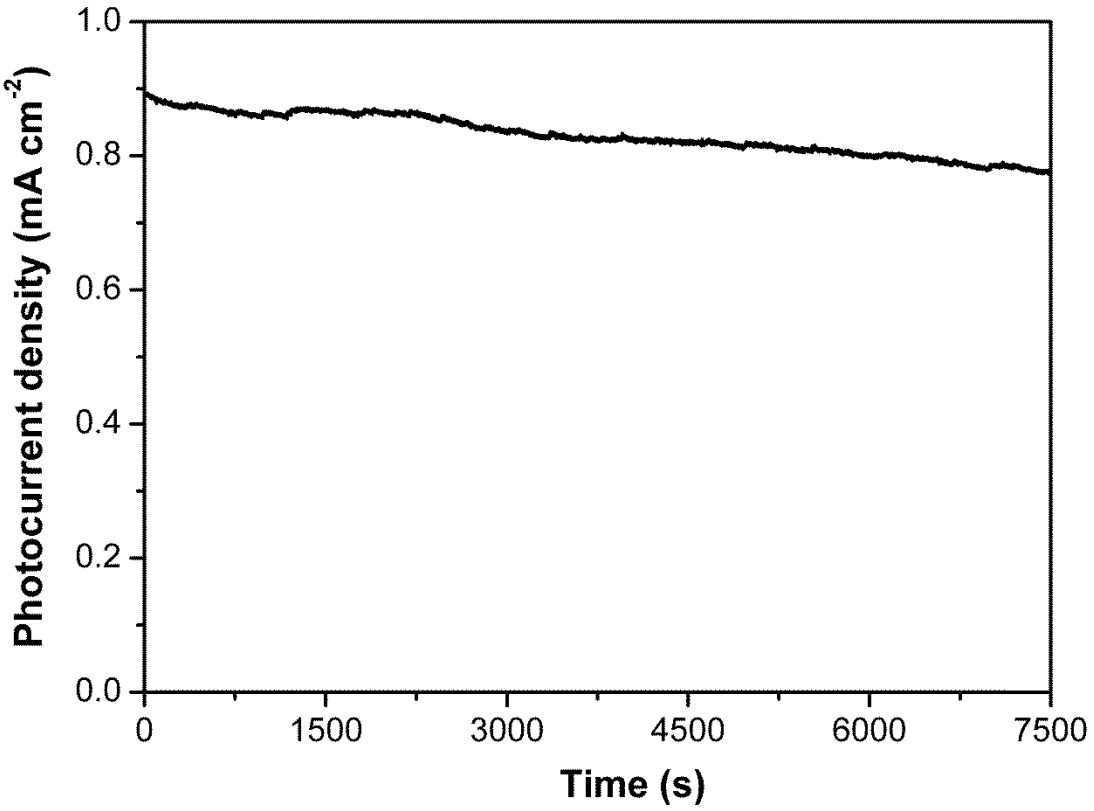

Figure S1 Long-term stability of TiO_2 urchin photoanode under continuous light illlumination

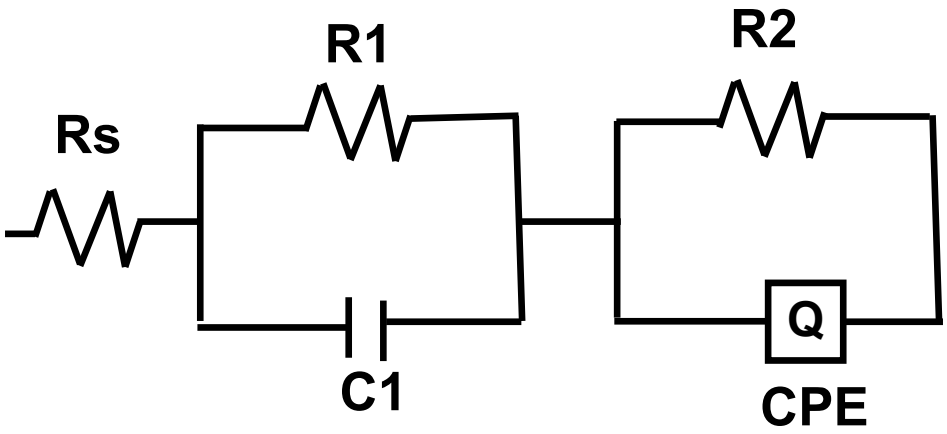

Figure S2 Equivalent curcuits used to fit the EIS response of the TiO_2 urchin and microspheres photoanodes under illumination.

R_s working medium resistance

R_1 charge transfer resistance between TiO_2/FTO interface.

C_1 TiO2 capacitance, including surface state and Helmholtze double layer

R_2 charge tranfer resistance between TiO_2/electrolyte interface

CPE contant phase element defined by CPE.

Table 1 Parameters of the Equivalent—Circuit components that are used to model the TiO_2 microspheres and TiO_2 urchin electrodes.

Parameters	R_s	C_1	R_1	CPE	R_2
TiO_2 microspheres	20.59 Ω	0.14 mF cm^{-2}	2139 Ω	0.001507	1109 Ω
TiO_2 urchin	20.87 Ω	0.76 mF cm^{-2}	16.14 Ω	$7.002E^{-9}$	49.7 Ω
Errors (microspheres)	5.53%	3.49%	4.68%	14.37%	3.92%
Errors (urchin)	6.53%	3.09%	5.61%	10%	3.63%