Supporting information

Boosting the Photoelectrochemical Water Oxidation Performance of TiO_2 Nanotubes by Surface Modification Using Silver Phosphate

Prabhakarn Arunachalam [1,*], Mabrook S Amer [1,2,*], Haneen A. AlOraij [1], Abdullah M. Al-Mayouf [1,2], Mahmoud Hezam [3,4] and Matar Al-Shalwi [1]

[1] Electrochemical Sciences Research Chair, Department of Chemistry, Science College, King Saud University, Riyadh 11451, Saudi Arabia
[2] K.A.CARE Energy Research and Innovation Center at Riyadh, Riyadh 11451, Saudi Arabia
[3] King Abdullah Institute for Nanotechnology, King Saud University, Riyadh 11451, Saudi Arabia
[4] Physics Department, College of Science, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh 13318, Saudi Arabia
* Correspondence: parunachalam@ksu.edu.sa (P.A.); msamer@ksu.edu.sa (M.S.A.); Tel.: +966-114696026 (P.A.)

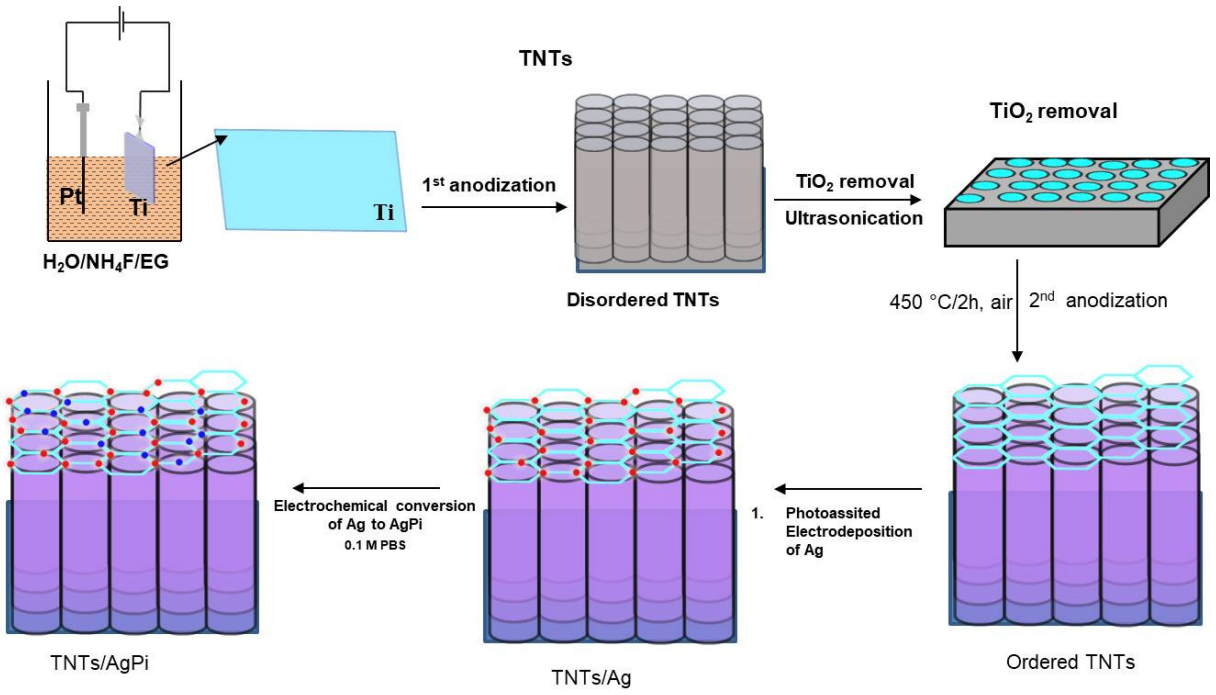

Figure S1. Fabrication of TNTs/AgPi photoanodes. Schematic representation of AgPi loading on TNTs photoanodes prepared by a twostep anodization process.

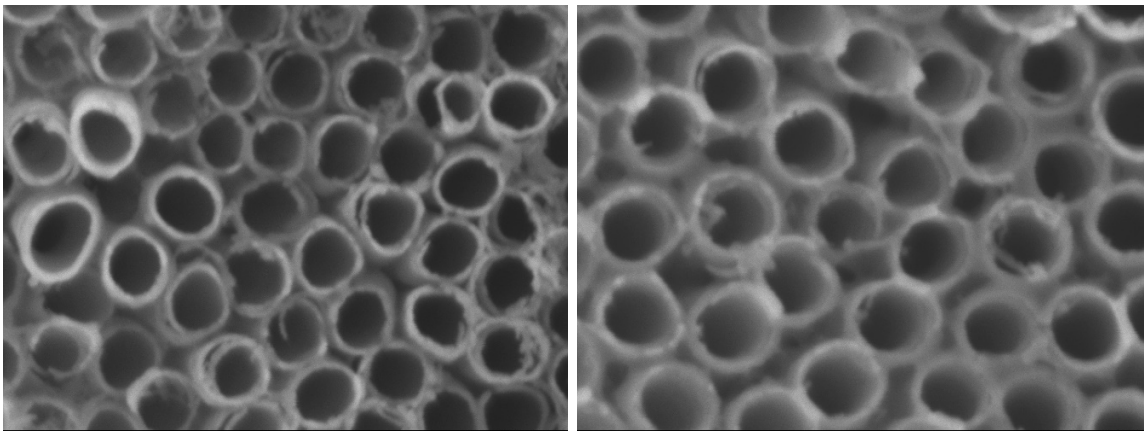

Figure S2. FESEM image of the TNTs/AgPi photoanode taken before (a) after J–t (b) measurement for 8 h in 0.1 M PBS (pH 7.5).

Table S1. Recent advances in reported TNTs-based photoelectrodes with water oxidation catalytic materials and their experimental conditions for photoelectrochemical water oxidation reactions.

S.No	Electrode	Electrolyte (pH)	Co-catalyst (synthesis, media and deposition time)	Current density (mA/cm^2)	Ref.
1	TNTs nanowire/CoPi	0.1 M PBS (pH 7)	Co-Pi photo-assisted electrodeposition	≈ 0.46 at 1.23 V_{RHE}	[1]
2	N-modified TiO_2 nanowires ($TiO_{1.988}N_{0.012}$)	1.0 M KOH	Hydrothermal Co and Ag	≈ 0.6 for Co @ ≈ 0.46 for Ag @ 1.23V_{RHE}	[2]
3	TiO_2/CdS/Co–Pi Nanowire Array	0.1 M KPi buffer (pH 7)	Co-Pi photoassisted electrodeposition	≈ 0.4 @ 1.23 V_{RHE}	[3]
4	CoPi/nanocrystalline TiO_2 (nc-TiO_2)	0.5 M $NaClO_4$	Co-Pi (photoassisted electrodeposition)	170 μA/cm^2 at 0.6 V vs. Ag/AgCl, 90 μA/cm^2 TiO_2 alone	[4]
5	$NiFeOH_x/TiO_2$	1.0 M KOH (pH 13.6)	Electrodeposition	0.2 @1.23 V_{RHE}	[5]
6	WO_3/TiO_2 NTs	1.0 M KOH	Anodization method	0.62 @ 0.2 $V_{Ag/AgCl}$	[6]
7	Hydrogenated TiO_2 NTs	1.0 M NaOH /1 wt% of EG	Electrochemical treatment	0.65 @ 0 $V_{Ag/AgCl}$	[7]
8	B-TiO_2/Al_2O_3	0.1 M Na_2SO_4	electrodeposition	1.2 @ 1.23 V_{RHE}	[8]
9	Reduced TiO_2 NTAs	1 M NaOH	Chemical method	0.73 @ 1.23 V_{RHE}	[9]
10	Ta/TNTs	1 M KOH	Electrochemical treatment	0.5 @0.2 $V_{Ag/AgCl}$	[10]
11	TNTs/ZrO_2 Oxygen deficient TNTs/ZrO_2	0.1 M NaPi buffer pH (7.5)	Electrodeposition/ Vaccum annealing	0.72 mA/cm2 @ 1.23 V vs RHE	[11]
12	TNTs/NiPi	0.1 M NaPi buffer pH (7.5)	Electrodeposition	0.92 mA/cm^2 @ 1.23 V vs RHE	[12]
13	TNTs /ZrO_2/CoPi Electrodeposition	0.1 M NaPi buffer pH (7.5)	Co-Pi photo-assisted electrodeposition	≈ 0.86 mA/cm^2 at 1.23 V vs RHE	[13]
14	TNTs/AgPi	0.1 M NaPi buffer pH (7.5)	Photodeposition	0.74 mA/cm^2 at 1.23 V vs. RHE	This work

Table S2. Impedance parameter values derived from the fitting to the equivalent circuit for1 the impedance spectra were examined under constant illumination conditions at 1.0 V vs. RHE.

Sample	R_s	Q_{PL}	R_{PL}	Q_{BL}	R_{BL}
TNTs light	39.3 Ω	3.18 μMho	624 kΩ	55.6 μMho	34 kΩ
TNTs/AgPi light	33.4 Ω	2.80 μMho	5.39 kΩ	12.2 μMho	17.4

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