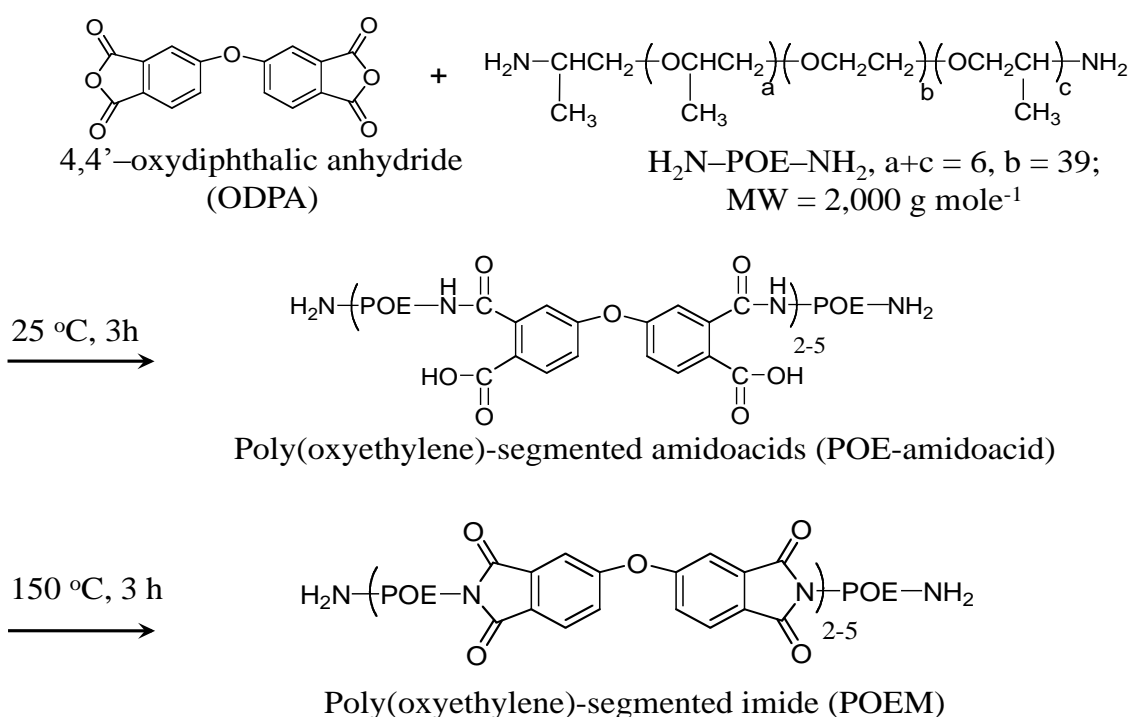


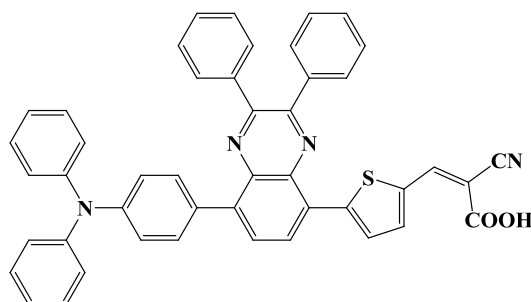
Electronic Supplementary Information

Efficient Titanium Nitride/Titanium Oxide Composite Photoanodes for Dye-Sensitized Solar Cells and Water Splitting

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Scheme S1. Synthetic procedure for poly(oxyethylene)-segmented amide-imide (POE-amide-imide) (POEM)^{1,2}.



Scheme S2. Molecular structure of CR147 dye^{3,4}.

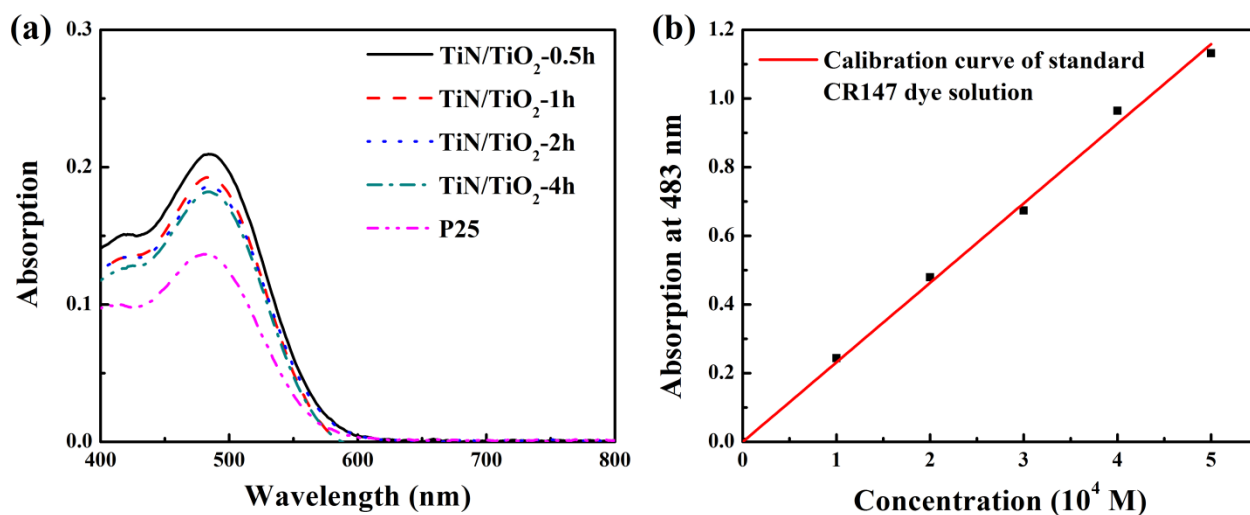


Figure S1. (a) Absorption spectra of the residual CR147 dye solutions after removing the dye-adsorbed films, and (b) a calibration curve of standard CR147 solution.

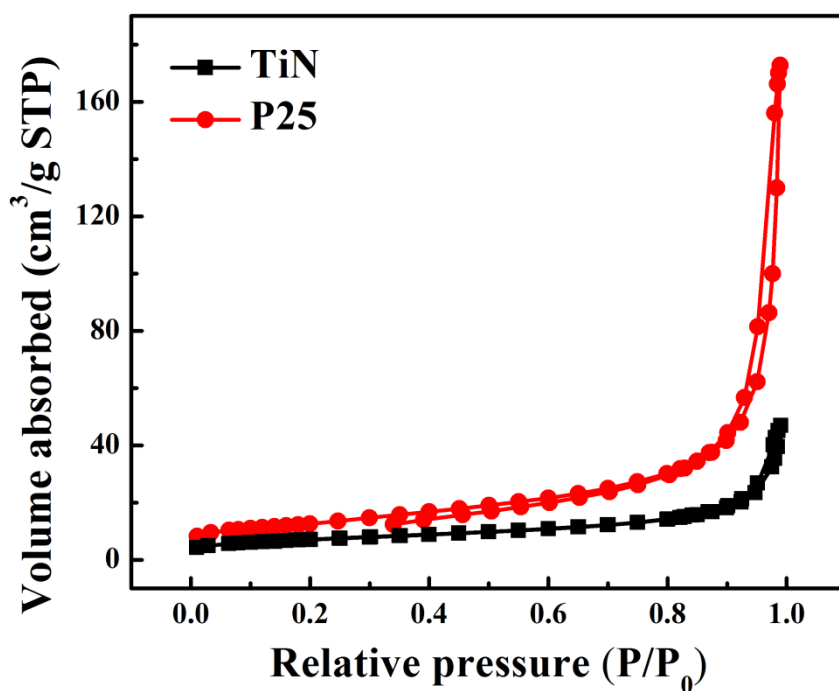


Figure S2. Brunauer–Emmett–Teller absorption/desorption curves of TiN and P25 nanoparticles.

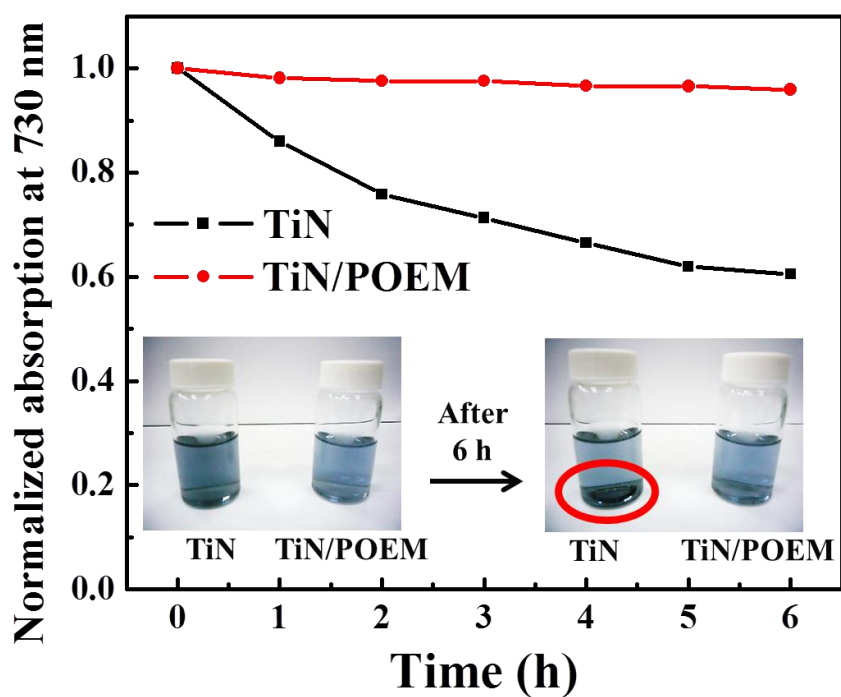


Figure S3. Plots of normalized absorption versus time at 730 nm for the aqueous solutions of TiN and TiN/POEM. The inserted photographic images show both aqueous solutions at 0 h and at 6 h separately.

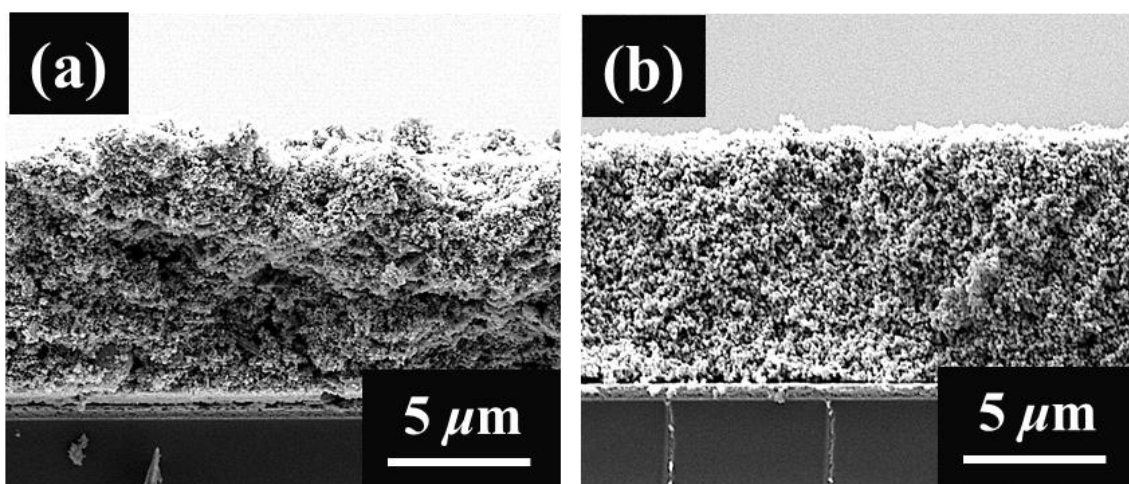


Figure S4. Cross-sectional FE-SEM images of (a) a TiN/TiO₂ composite film and (b) the P25 film.

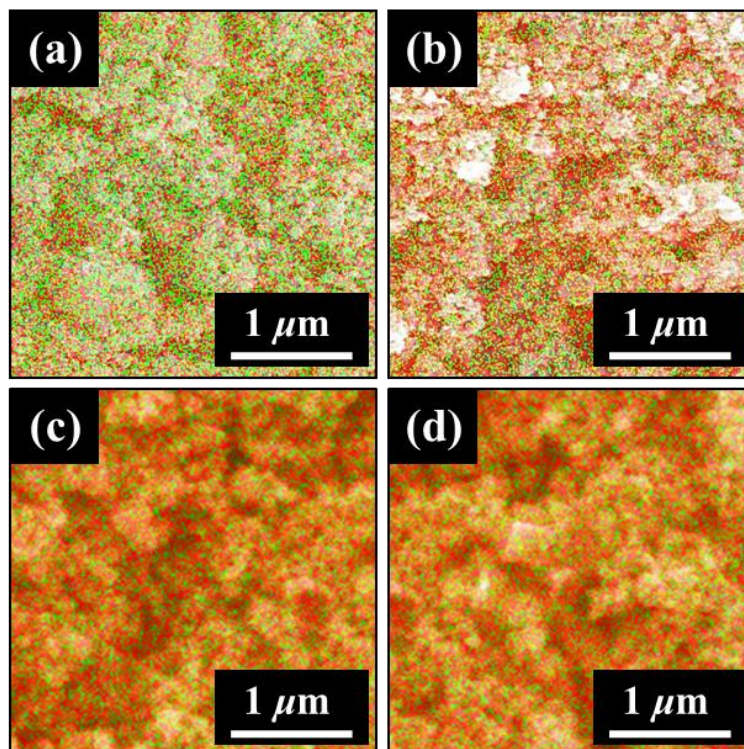


Figure S5. Elemental mapping images of films of (a) TiN/TiO₂-0.5h, (b) TiN/TiO₂-1h, (c) TiN/TiO₂-2h, and (d) TiN/TiO₂-4h; the red dots represent the signals of oxygen element, while the green dots represent the signals of nitrogen element.

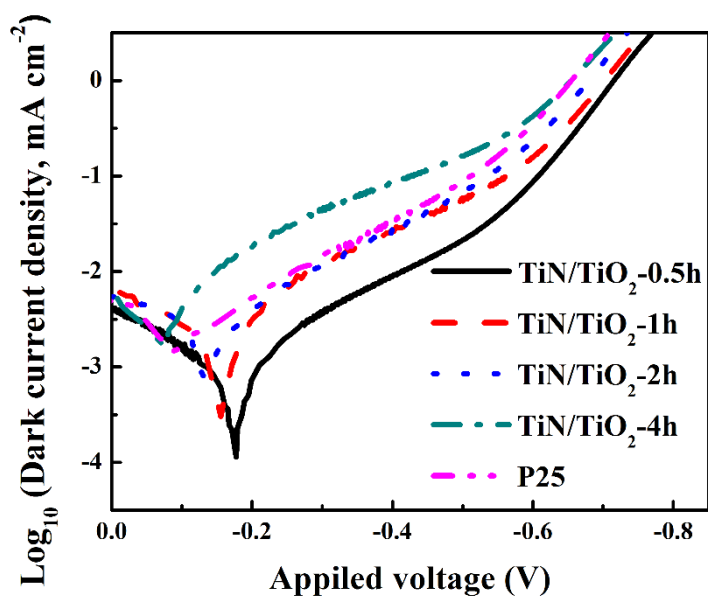


Figure S6. Logarithmic dark current density vs. applied voltage for the DSSCs with different photoanodes, measured at dark condition.

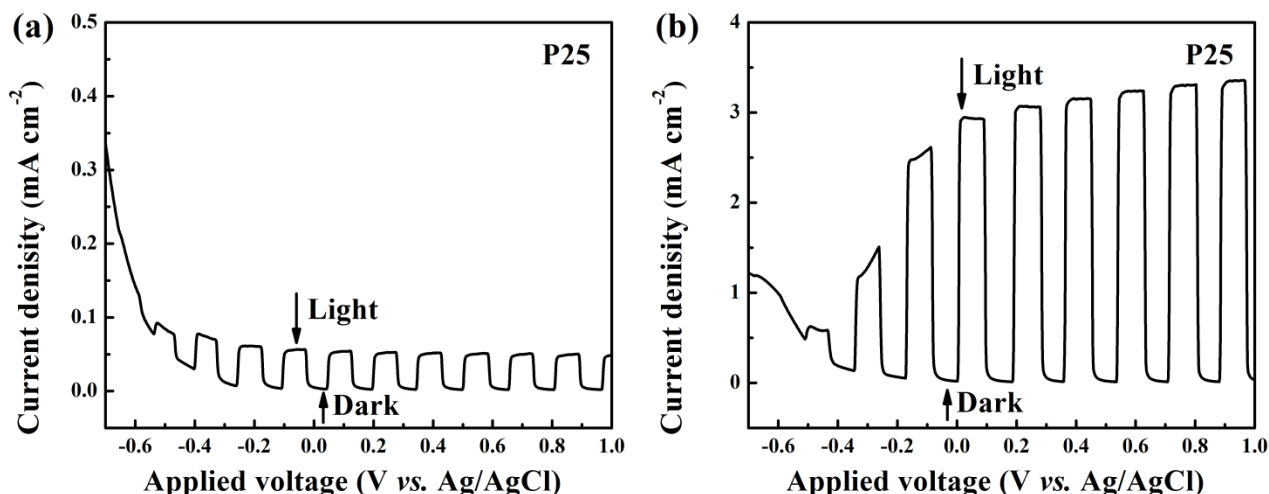


Figure S7. Photo-induced current density–voltage curves for the electrochemical water splitting devices with P25 photoanode, measured under (a) 100 mW cm⁻² (AM 1.5G) and (b) ultraviolet (UV) light illumination.

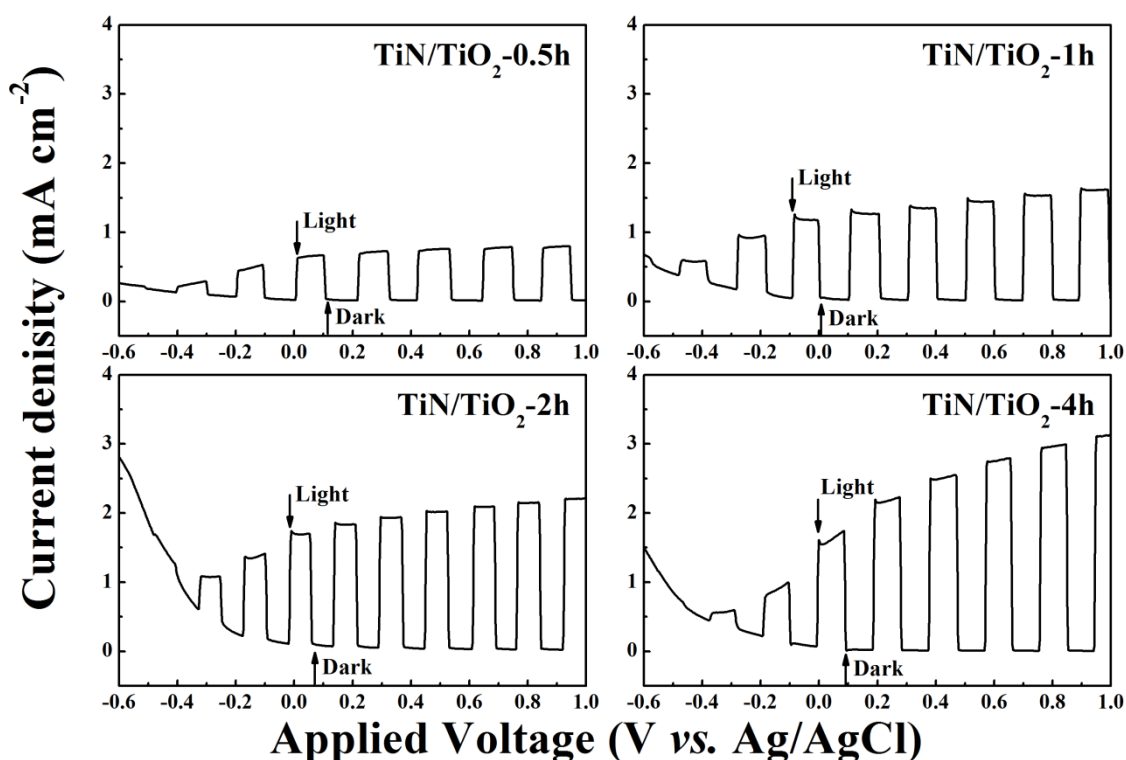


Figure S8. Photo-induced current density–voltage curves for the electrochemical water splitting devices with various TiN/TiO₂ composite photoanodes, measured under ultraviolet (UV) light illumination.

Reference

1. R. X. Dong, S. Y. Shen, H. W. Chen, C. C. Wang, P. T. Shih, C. T. Liu, R. Vittal, J. J. Lin and K. C. Ho, *J. Mater. Chem. A*, 2013, 1, 8471.
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