

Supplementary Information

How Do Plants See the World? - UV Imaging with TiO₂

Nanowire Array by Artificial Photosynthesis

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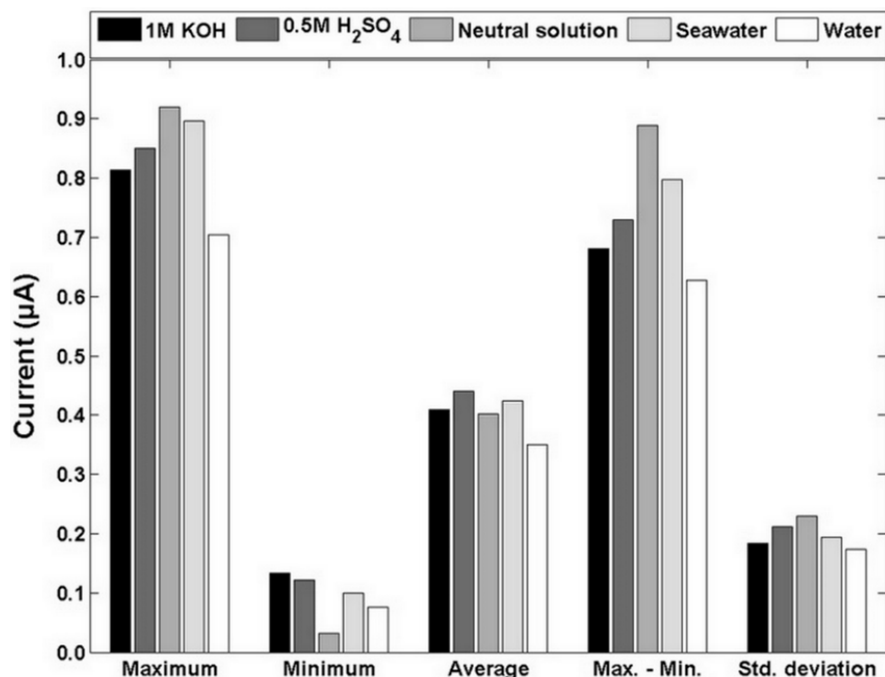


Fig S1. The comparison of photocurrents acquired from image scanning with five different conditions. The photocurrents obtained from the five different conditions are compared in table S1 and figure S1. The dynamic range and contrast are calculated for image quality evaluation. The dynamic range is the total range of current obtained with the sensor from minimum to maximum. In addition of the dynamic range, contrast is a basic perceptual attribute of an image. Since the visual system is more sensitive to contrast than absolute luminance, root-mean-square (RMS) contrasts are calculated from the images acquired in five different conditions. RMS contrast is define as the standard deviation of the pixel intensities.¹ Based on the results of 0.5M H₂SO₄, the results of the other conditions show only a small difference of $\pm 0.04 \mu\text{A}$ on the RMS value. These results confirmed that TiO₂ in solutions can be used in a stable way to acquire images under different environments.

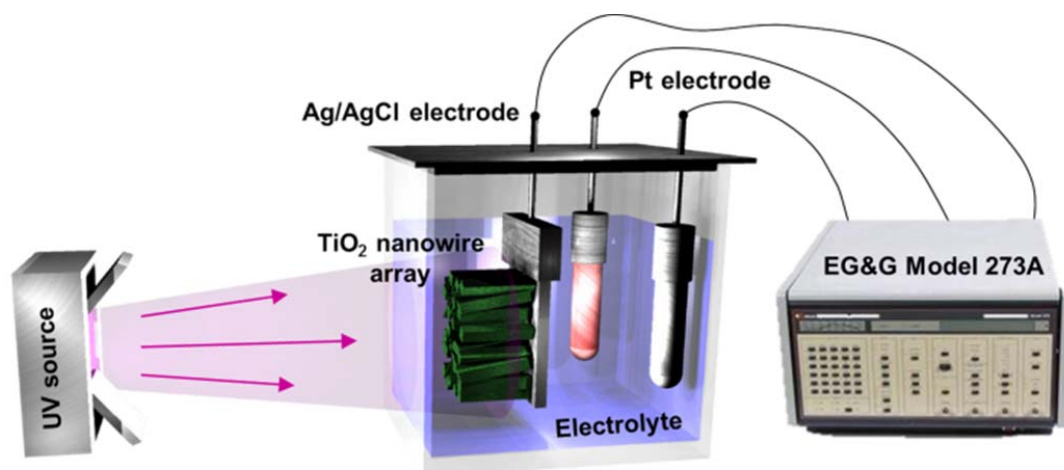


Fig S2. Schematic illustration of IPCE measurement with three-electrode system.

Table S1. The photocurrents measured from image scanning with five different conditions

Electrolytes	Max. (μA)	Min. (μA)	Avg. (μA)	Max. – Min. ^a (μA)	Std. deviation ^b (μA)
1M KOH	0.814	0.134	0.409	0.680	0.184
0.5M H ₂ SO ₄	0.850	0.121	0.441	0.729	0.211
Neutral solution	0.919	0.031	0.402	0.888	0.230
Seawater	0.896	0.099	0.424	0.797	0.194
Water	0.704	0.076	0.351	0.628	0.173

^aThe dynamic range is the total range of the sensor from minimum to maximum (Max. – Min.). ^bRoot mean square (RMS) contrast is defined as the standard deviation of the pixel intensities.

REFERENCES

- 1 E. Peli, *J Opt Soc Am A*, 1990, **7**, 2032-2040.