

Electronic Supplementary Information

Organophotocatalysis system of p/n bilayers for wide visible-light-induced molecular hydrogen evolution

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Absorption spectra of H_2Pc/C_{60} and PTCBI/ H_2Pc bilayers

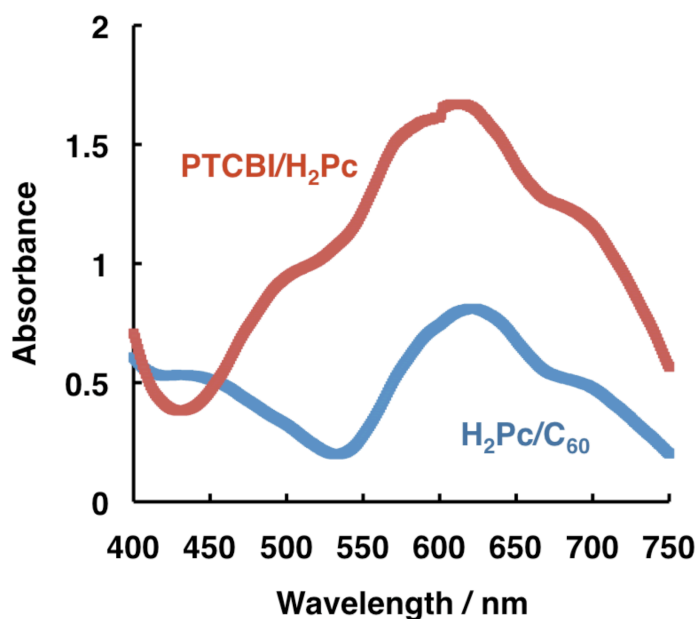


Fig. S1 Absorption spectra of H_2Pc/C_{60} and PTCBI/ H_2Pc bilayers. Film thickness of H_2Pc/C_{60} , H_2Pc = 75 nm and C_{60} = 125 nm. Film thickness of PTCBI/ H_2Pc , PTCBI = 300 nm and H_2Pc = 60 nm.

Table S1 Comparison of photoenergy conversion efficiency (η) and EQE for other visible-light photocatalysts with those values for the present system. For reference, the efficiencies for the photovoltaic cells of C₆₀/H₂Pc are also listed.

System	η / %	EQE / % ^a	Reference
Organic photovoltaic cell			
C ₆₀ /H ₂ Pc	0.03	1.0 (600 nm)	1
C ₆₀ /H ₂ Pc	0.25	----	2
C ₆₀ /H ₂ Pc including co-evaporant	2.5	----	2
p-i-n-structured C ₆₀ /H ₂ Pc ^b	2.5	65 (650 nm)	3
Photocatalyst for H₂ evolution			
(co-catalyst)			
TiO ₂ ^c	0.4	----	4
SrTiO ₃ :Rh (Ru) ^d	0.12	1.7 (420 nm) 0.2 (500 nm)	5
dye-modified KTa(Zr)O ₃ (Pt)	0.013	----	6
In _{0.9} Ni _{0.1} TaO ₄ (NiO _y)	----	0.66 (402 nm)	7
(CuAg) _{0.15} In _{0.3} Zn _{1.4} S ₂ (Ru)	----	7.4 (520 nm)	8
		1.0 (600 nm)	
TaON (Pt) ^e	----	0.4 (420 nm)	9
[(Ga _{1-x} Zn _x)(N _{1-x} O _x)] (Rh _{2-y} Cr _y O ₃)	----	5.9 (420-440 nm)	10
CdS (Pt-PdS)	----	93 (420 nm)	11
g-C ₃ N ₄ (Pt)	----	0.1 (420-460 nm)	12
ZrO ₂ /TaON (Pt) ^e	----	6.3 (420.5 nm)	13
CuGa ₂ In ₃ S ₈ (Rh)	----	15 (560 nm)	14
		12 (600 nm)	
		5 (640 nm)	
ZnIn ₂ S ₄ (Pt)	----	34 (420 nm)	15
		24 (550 nm)	
A wired PEC cell of a commercial triple-junction amorphous silicon photoanode ^f	4.7	----	16
A wireless cell of a commercial triple-junction amorphous silicon (NiMoZn)	2.5	----	16
H ₂ Pc/C ₆₀ (Pt)	----	4.0 (600 nm) 1.2 (700 nm)	this work

^a The value in the parenthesis represents the wavelength employed for measuring EQE.

^b The term “i” indicates a co-deposition layer of C₆₀ and H₂Pc. The EQE value was estimated from the reported internal quantum efficiency and the absorption ratio of the film employed.

^c A typical UV-responsive photocatalyst.

^d In the Z-scheme photocatalysis system, the photocatalyst was concurrently used in combination with BiVO₄ photocatalyst for O₂ evolution.

^e In the Z-scheme photocatalysis system, the photocatalyst was used in combination with Pt-loaded WO₃ photocatalyst for O₂ evolution in the presence of IO₃⁻/I⁻.

^f H₂ occurred at a counter electrode of NiMoZn loaded on Ni mesh.

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