Supporting Information

Enhancing Hydrogen Production by Photobiocatalysis through *Rhodopseudomonas palustris* Coupled with Conjugated Polymers

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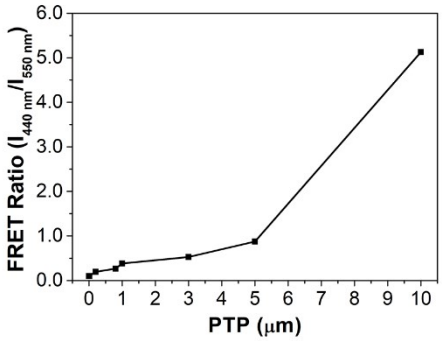


Figure S1. The FRET ratio ($I_{440\ nm}/I_{550\ nm}$) of OF/PTP pair as the PTP concentration gradually increases. [OF] = 1 μM, [PTP] = 0-10.0 μM.

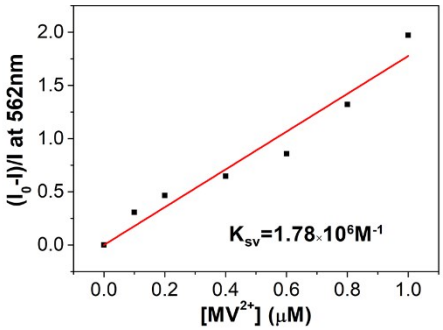


Figure S2. Stern-Volmer quenching curve of PTP in the presence of MV^{2+}. [PTP] = 10 μM, [MV^{2+}] = 0-1.0 μM.

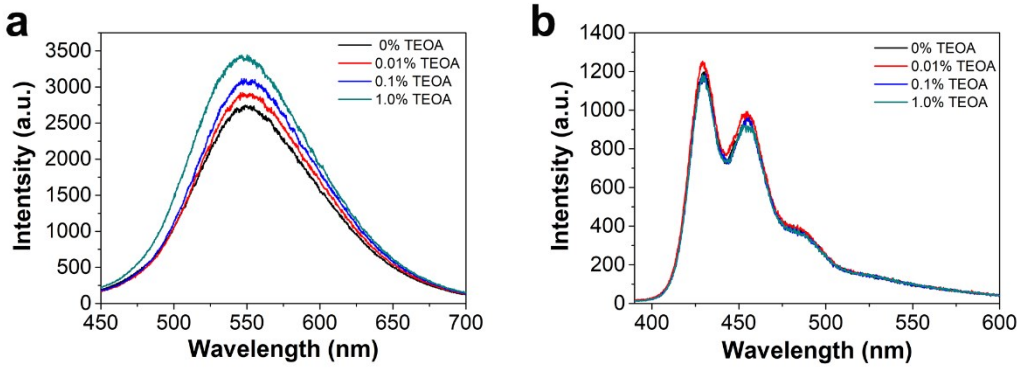


Figure S3. (a) Fluorescence spectra of PTP in different concentrations of TEOA. [PTP] = 20 μM, [TEOA] = 0-1% (v/v). (b) Fluorescence spectra of OF in different concentrations of TEOA. [OF] = 10 μM, [TEOA] = 0-1% (v/v).

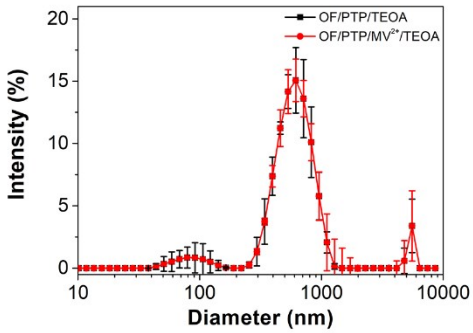
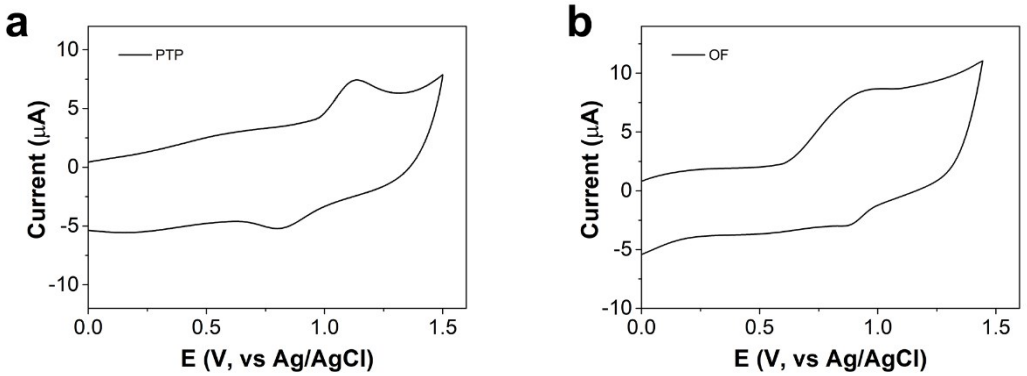


Figure S4. Dynamic light scattering measurement of OF/PTP/TEOA and OF/PTP/MV^{2+}/TEOA in aqueous solution. [PTP] = 20 μM, [OF] = 20 μM, [MV^{2+}] = 500 μM, [TEOA] = 1% (v/v).



c

	λ_{onset} (nm)	E_g(eV)	E_{ox} (V)	HOMO (eV)	LOMO (eV)
PTP	410	3.02	1.02	-5.42	-2.40
OF	370	3.35	0.61	-5.01	-1.66

Figure S5. Cyclic voltammetry (CV) of PTP (a) and OF (b) in 2 mL 0.1M tetrabutylammonium hexafluorophosphate in anaerobic acetonitrile solution. (c) The electrochemical properties and calculated energy levels of PTP and OF.

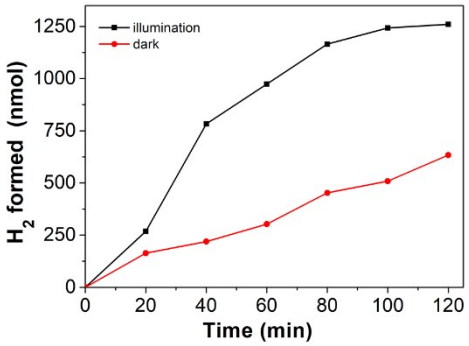


Figure S6. The hydrogen production of OF/PTP/MV^{2+}/TEOA/*R. palustris* complex with and without irradiation. [PTP] = 20 μM, [OF] = 10 μM, [MV^{2+}] = 5 mM, [TEOA]=

1% (v/v), light intensity was 10 mW cm^{-2}.

Table S1. Hydrogen production in different systems

Systems	H_2 evolution amount	Reference
OF/PTP/MV^{2+}/TEOA/*R. palustris*	0.63 μmol h^{-1}	This work
g-C_3N_4/TEOA	0.2 μmol h^{-1}	*J. Am. Chem. Soc*, 2009, 131, 1680-1681.
CPs/EDTA/DuBois-type NiP	429 $mmol_{H2}$ g_{CP}^{-1} h^{-1}	*ACS Appl. Mater. Interfaces*, 2018, 10, 10828-10834.
PT/MV^{2+}/EDTA/PVA-Pt	0.21 μmol h^{-1}	*ACS Appl. Mater. Interfaces*, 2017, 9, 10355-10359.
CdS NPs/*R. palustris*	1.25 μmol h^{-1}	*Energy Environ. Sci.*, 2019, 12, 2185-2191.
Eosin Y/MV^{2+}/TEOA/*S. oneidensis*	0.18 μmol h^{-1}	*ACS Catalysis*, 2017, 7, 7558-7566.
CdS/MV^{2+}/engineered *E.coli*	0.34 ± 0.01 mmol/10^8 cells	*Sci. adv.*, 2018, 4, eaap9253.

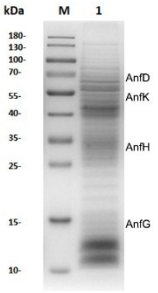


Figure S7. SDS-PAGE analysis of *R. palustris* protein extracted by ultrasonication treatment. Lane M: molecular weight marker; 1: cell extract. Total protein content was 15 μg. (AnfD, AnfK, AnfH, AnfG were the subunit of nitrogenase)

References

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