

Supplementary Materials

Designing Black Phosphorus and Heptazine-Based Crystalline Carbon Nitride Composites for Photocatalytic Water Splitting

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Figure S1. Photocatalytic hydrogen production equipment (CEL-SPH2N system).

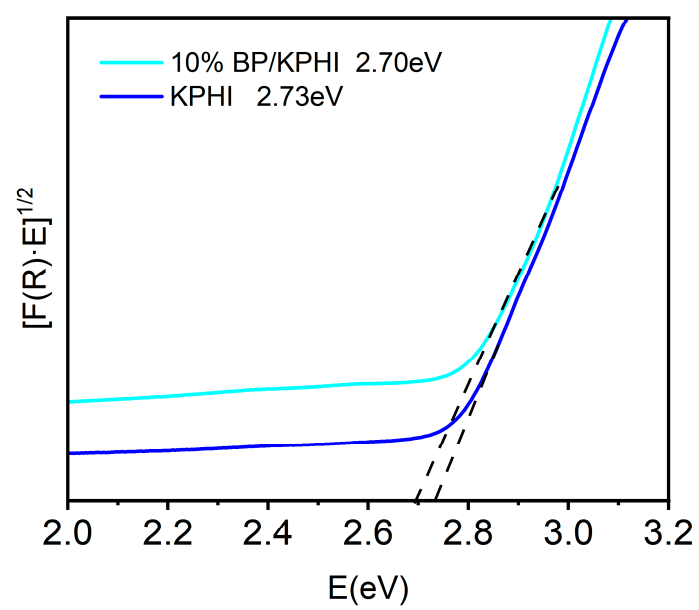


Figure S2. Band gap energies of KPHI and 10% BP/KPHI.

Table S1

Analysis result of EDS spectrum from 10% BP/KPHI

Z	Element	Family	Atomic Fraction(%)	Atomic Error(%)	Mass Fraction(%)	Mass Error (%)	Fit error (%)
6	C	K	84.52	5.39	5.39	3.29	2.19
7	N	K	10.7	2.32	11.41	2.41	5.78
15	P	K	4.78	0.97	11.27	2.23	4.2

Table S2

Photocatalytic hydrogen production rate in the no-treatment control group

Entry	Removed component	H ₂ production rate [mmol g ⁻¹ h ⁻¹]
1	None	4.3 ± 0.1
2	No H ₂ PtCl ₆	0.03 ± 0.01
3	No methanol	< 0.01
4	No H ₂ O	< 0.01
5	No light	< 0.01
6	Changing methanol to triethanolamine	3.1 ± 0.1

Table S3

Summary of the photocatalytic activities of BP-based photocatalysts for H₂ evolution.

Photocatalyst	Cocatalyst	Sacrificial agent	Light source	HER ($\mu\text{mol h}^{-1}$)	Ref.
BP/KPHI	Pt	Methanol	Xe, 300 W, > 420 nm	215	This work
BP-BM	-	Na ₂ S/Na ₂ SO ₃	Xe, 300 W, > 420 nm	2.6	[1]
BP nanosheets	-	Methanol	Xe, 300 W, > 420 nm	0.37	[2]
BP/TiO ₂ mesocrystal	Pt	Methanol	Asahi Spectra Hal-320, 200 mW cm ⁻² , > 420 nm	1.9	[3]
CoP/BP	-	Oxalic acid	Xe, 300 W, > 420 nm	1.4	[4]
BP/CN	-	Methanol	Xe, 300 W, > 420 nm	0.6	[5]
BP/CN	-	Isopropanol	LED, 440-445 nm	1.57	[6]
BP/Pt/RGO	-	EDTA	Xe, 320 W, > 420 nm	1.3	[7]
BP-Au/La ₂ Ti ₂ O ₇	-	Methanol	Xe, 320 W, > 420 nm	1.7	[8]

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