

## Supporting Information

### Novel CuBr-assisted graphdiyne synthesis strategy and application for efficient photocatalytic hydrogen evolution

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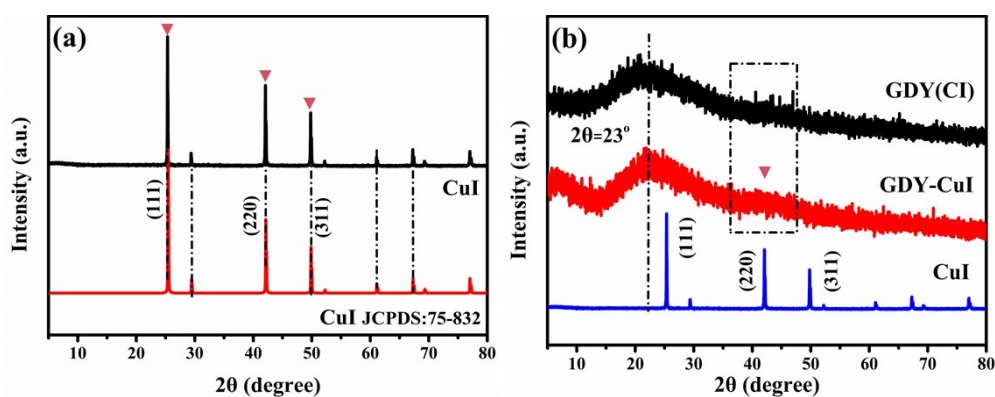


Fig.S1 XRD pattern of (a) CuI, (b)GDY(CI), GDY-CuI, and CuI.

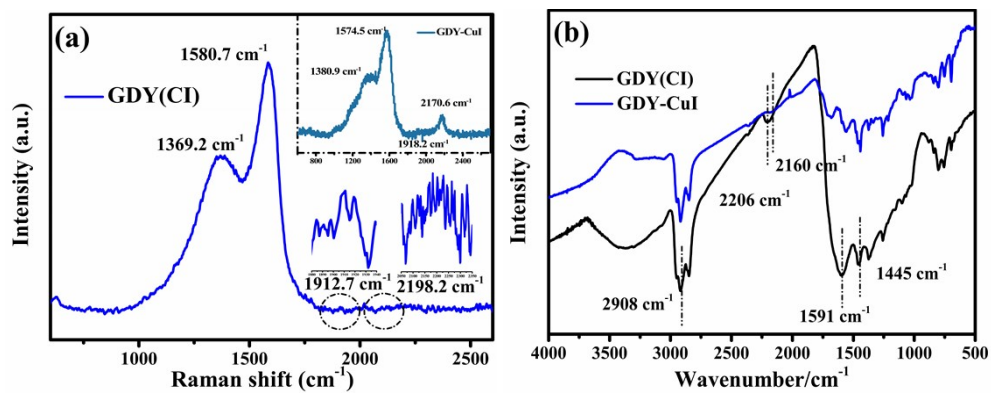


Fig.S2 Raman pattern of (a) GDY(CI), the insert picture is GDY-CuI, (b)FT-IR spectra of GDY(CI) and GDY-CuI.

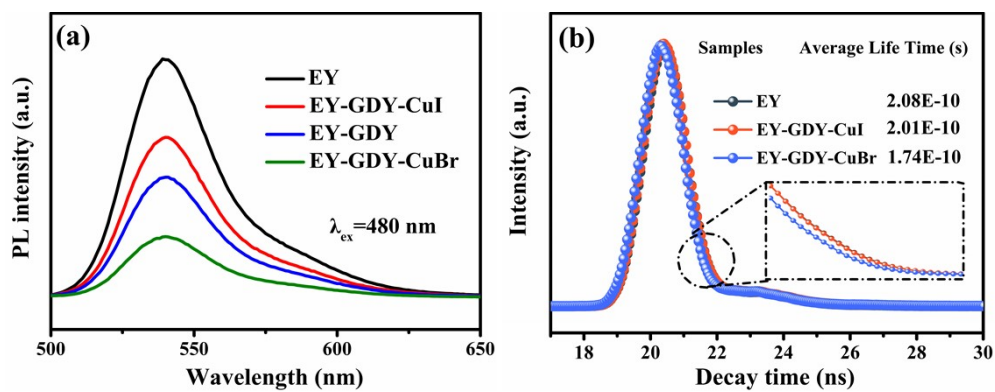


After adding sacrificial reagent

Ultrasonic treatment

After light irradiation for 5h

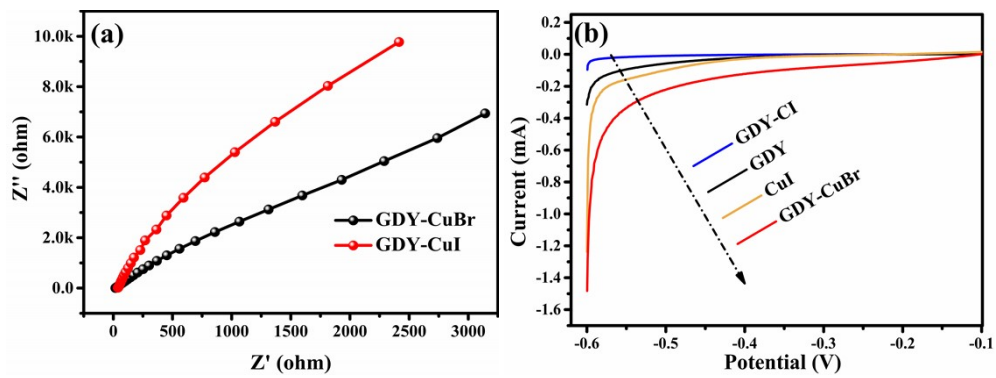
**Fig.S3** Color change of CuBr and CuI in the photocatalytic hydrogen evolution process.



**Fig.S4** (a) Photoluminescence spectroscopy of EY, GDY, GDY-CuI, and GDY-CuBr, (b) time-resolved photoluminescence spectra of EY, GDY-CuI, and GDY-CuBr.

**Table S1** Exponential curve fitting parameters of emission decay for the samples.

Samples	$\tau_1$ [ns]	$\tau_2$ [ns]	$\chi^2$	$\tau_{av}$ [ns]
EY	0.21(B <sub>1</sub> =100%)	---	0.85	0.21
GDY-CuI	4.52(B <sub>1</sub> =0.54%)	0.20(B <sub>2</sub> =99.46%)	0.89	0.20
GDY-CuBr	3.87(B <sub>1</sub> =0.94%)	0.17(B <sub>2</sub> =99.06%)	1.01	0.17



**Fig.S5** (a) Electrochemical impedance spectroscopy of GDY, and GDY-CuI, (b) Linear sweep voltammograms of GDY, CuI, GDY-CuI, and GDY-CuBr.