Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Sensitization of Bismuth Tungstate with Magnesium Phthalocyanine for Photoinduced Charge Redistribution and Electron Localization: CO_2 photoreduction from Vis to NIR Region

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Table S1. Comparison studies of photocatalytic CH_4 production yield of Bi_2WO_6 catalysts and metal phthalocyanine sensitized photocatalysts.

Photocatalysts	**CH_4 yield (μmol/g·h)**	**Light source**	**References**
Oxygen defect Bi_2WO_6 nanoplatelets	0.54	500 W Xenon lamp, Vis (λ > 400 nm)	Chem. Commun., 2016, **52**, 14242.
CQDs-Bi_2WO_6	0.90	500 W Xenon lamp, Vis (λ > 400 nm)	Nano Res., 2017, **10**, 1720.
Bi_2WO_6 nanotubes	0.13	300 W Xenon lamp	RSC Adv., 2020, **10**, 8821-8824
Cl-modified Bi_2WO_6 nanosheets	1.65	300 W Xenon lamp	ACS Appl. Mater. Interfaces, 2020, **12**, 54507-54516.
Z-scheme Bi_2WO_6/Au/CdS	~0.75	300 W Xenon lamp Vis (λ > 400 nm)	Nanotechnology, 2017, **28**, 274002
Atomically thin Bi_2WO_6 nanosheets	0.63	300 W Xenon lamp AM 1.5	Appl. Catal., 2021, **283**, 119630.
Z-scheme $Cs_2AgBiBr_6$/Bi_2WO_6	0.41	300 W Xenon lamp AM 1.5	J. Colloid Interface Sci., 2023, **629**, 233-242
Z-scheme Bi_2WO_6/$InVO_4$	1.13	300 W Xenon lamp, Vis (λ > 420 nm)	Chem. Eng. J., 2022, **446**, 137129
FePc-WO_3 nanocomposites	~1.50	300 W Xenon lamp	Appl. Catal. B, 2020, **270**, 11849
CuPc/g-C_3N_4 heterojunctions	~0.25	500 W Xenon lamp, Vis (λ > 420 nm)	Appl. Catal. B, 2020, **277**, 119199
ZnPc/$BiVO_4$ ultrathin nanocomposites	~0.60	500 W Xenon lamp, Vis (λ > 420 nm)	Angew. Chem. Int. Ed., 2019, **58**, 10873-10878
MgPc/Bi_2WO_6 nanosheets	**0.96**	**500 W Xenon lamp, Vis (λ > 410 nm)**	**Current study**

Table S2. Summary of EIS fitted parameters on the circuit model.

Sample	**R_s (Ω)**	**R_{CT} (kΩ)**	**CPE (μMho)**	**Goodness of fit**
BWO	10.9	**9.40**	25.1	0.997
1.0% MgPc-BWO	25.5	**7.63**	51.1	0.994

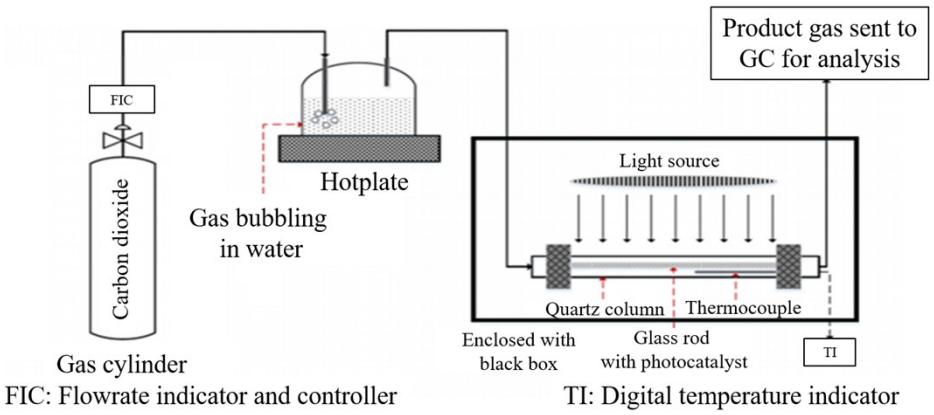

Fig. S1 Illustration of the photocatalysis rig for the CO_2 photoreduction experiment.

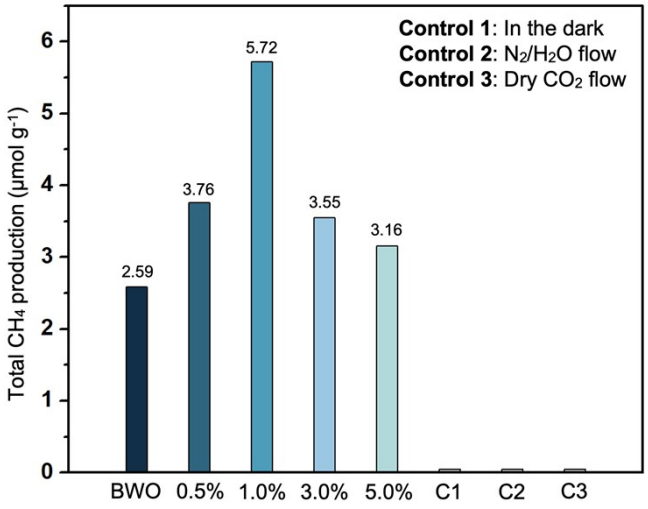

Fig. S2 Total average yields of CH_4 produced from CO_2/H_2O flow over as-synthesized samples after 6 h of visible light irradiation. The control experiments were conducted in the conditions of: (1) in the dark, (2) under N_2/H_2O flow, and (3) under dry CO_2 flow.

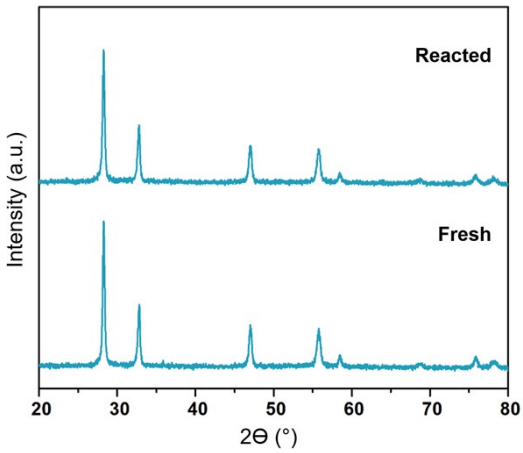

Fig. S3 XRD spectra of fresh and reacted 1.0% MgPc-BWO.

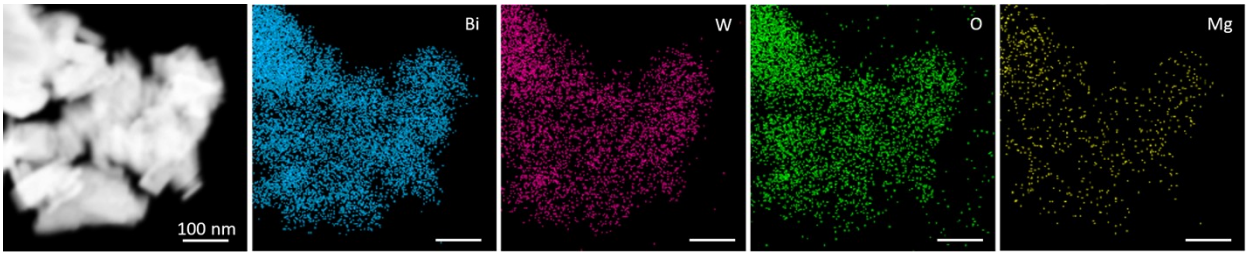

Fig. S4 EDX mapping of reacted 1.0% MgPc-BWO.

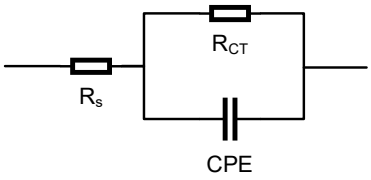

Fig. S5 Proposed EIS equivalent model circuit.