

Supporting Information

Triple-channel charge transfer over $\text{W}_{18}\text{O}_{49}/\text{Au}/\text{g-C}_3\text{N}_4$ Z-scheme photocatalysts for achieving broad-spectrum solar hydrogen production

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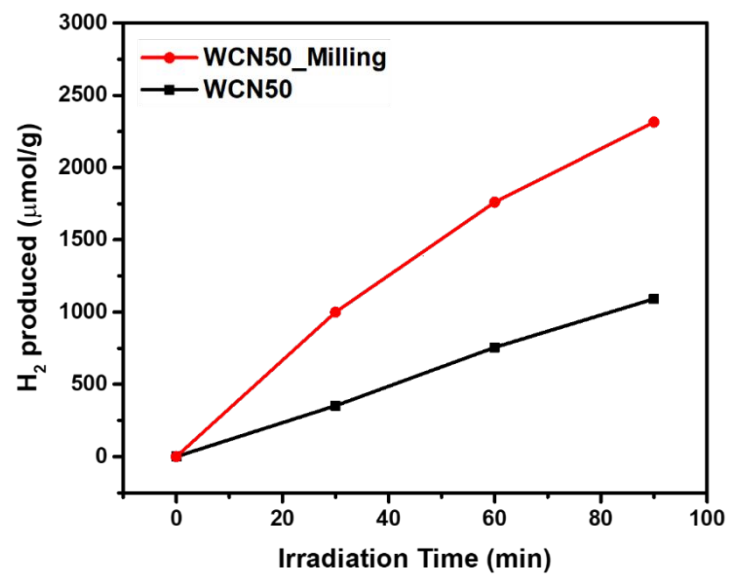


Figure S1. Performance of H₂ production on WCN50 before (756.2 μmol/g·h) and after (1760.6 μmol/g·h) milling under one-sun irradiation.

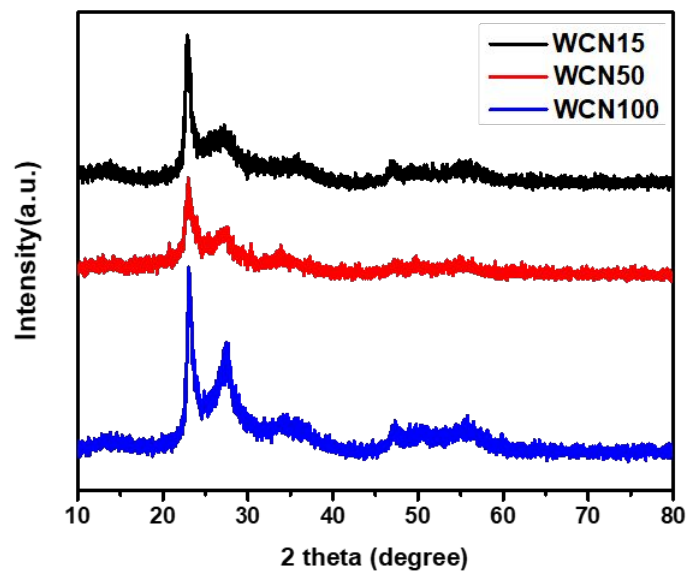


Figure S2. XRD patterns of WCN15, WCN50, and WCN100.

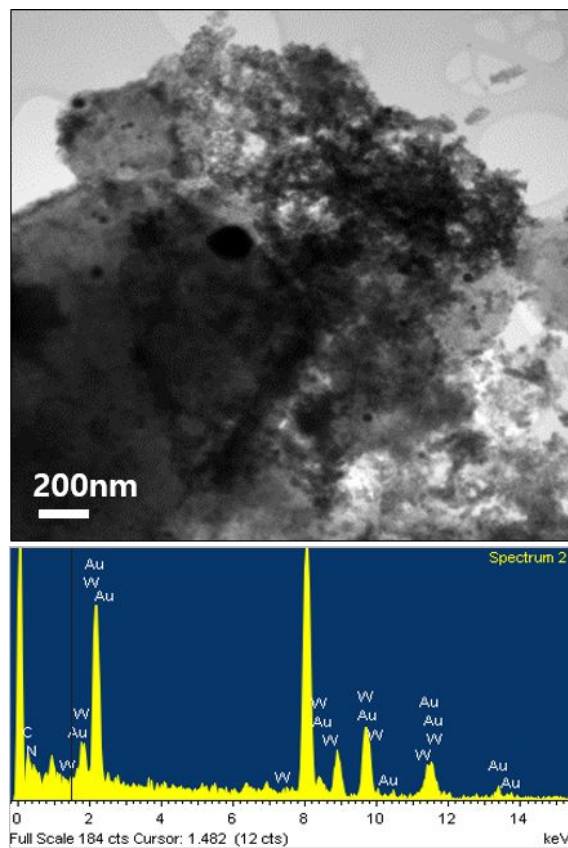


Figure S3. TEM image and EDS data of $\text{W}_{18}\text{O}_{49}/\text{Au}/\text{g-C}_3\text{N}_4$.

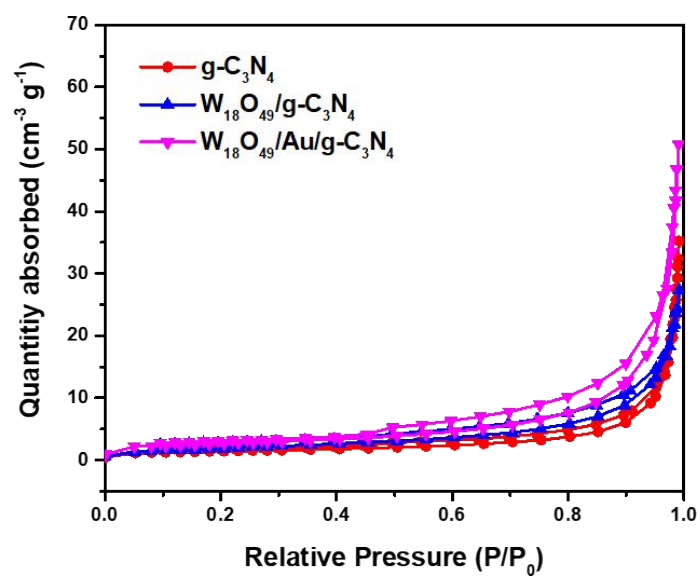


Figure S4. N₂ adsorption–desorption isotherms of g-C₃N₄, W₁₈O₄₉/g-C₃N₄, and W₁₈O₄₉/Au/g-C₃N₄.

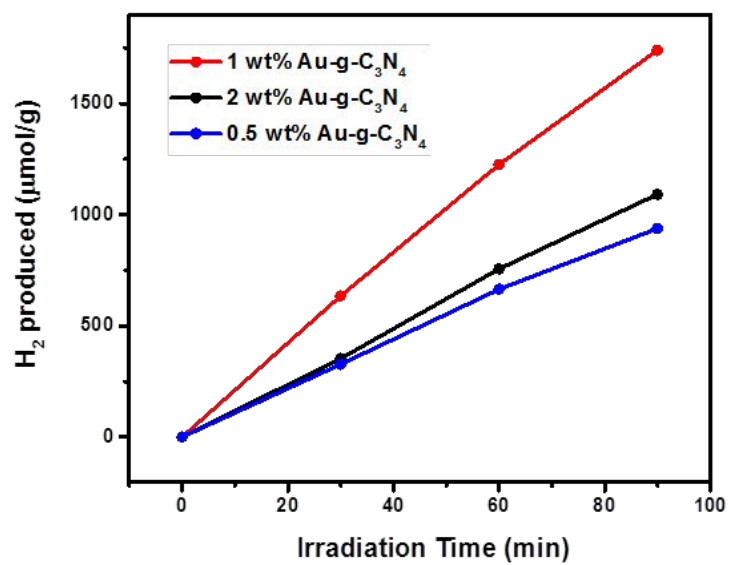


Figure S5. Performance of H₂ production on Au-g-C₃N₄ for different weight ratios of Au.

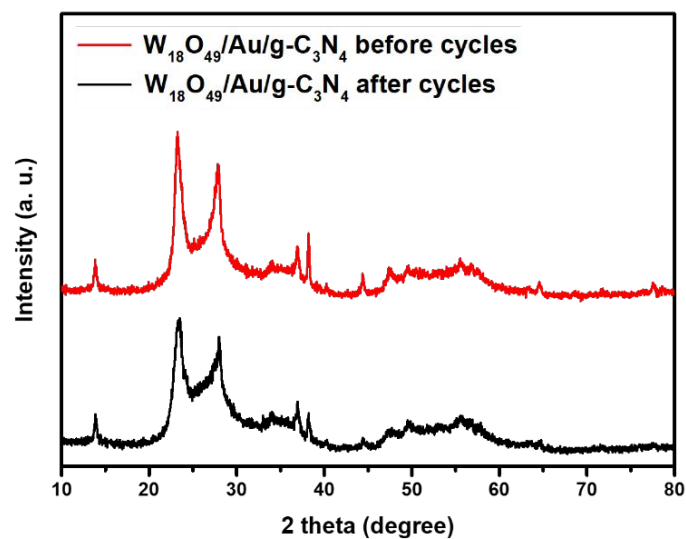


Figure S6. XRD patterns of $\text{W}_{18}\text{O}_{49}/\text{Au}/\text{g-C}_3\text{N}_4$ before and after cycling test.

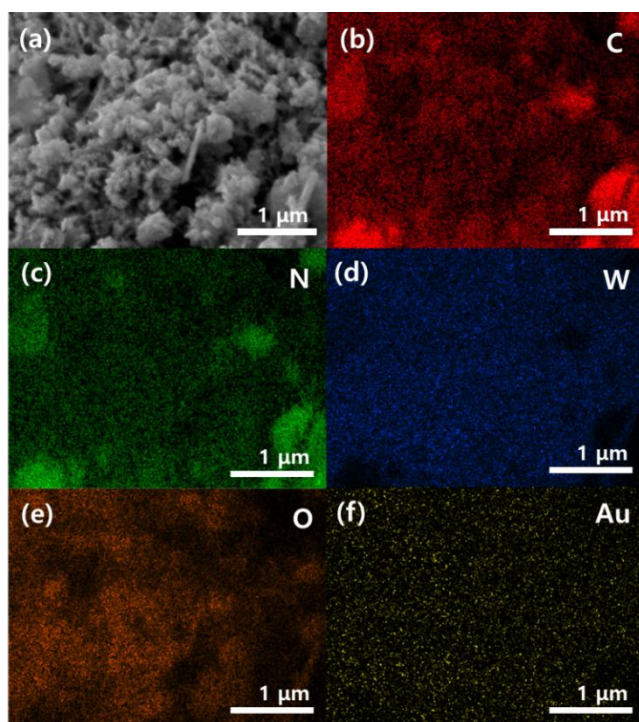


Figure S7. a) SEM image and (b-f) the corresponding EDS mapping data of $\text{W}_{18}\text{O}_{49}/\text{Au}/\text{g-C}_3\text{N}_4$ after cycling test.

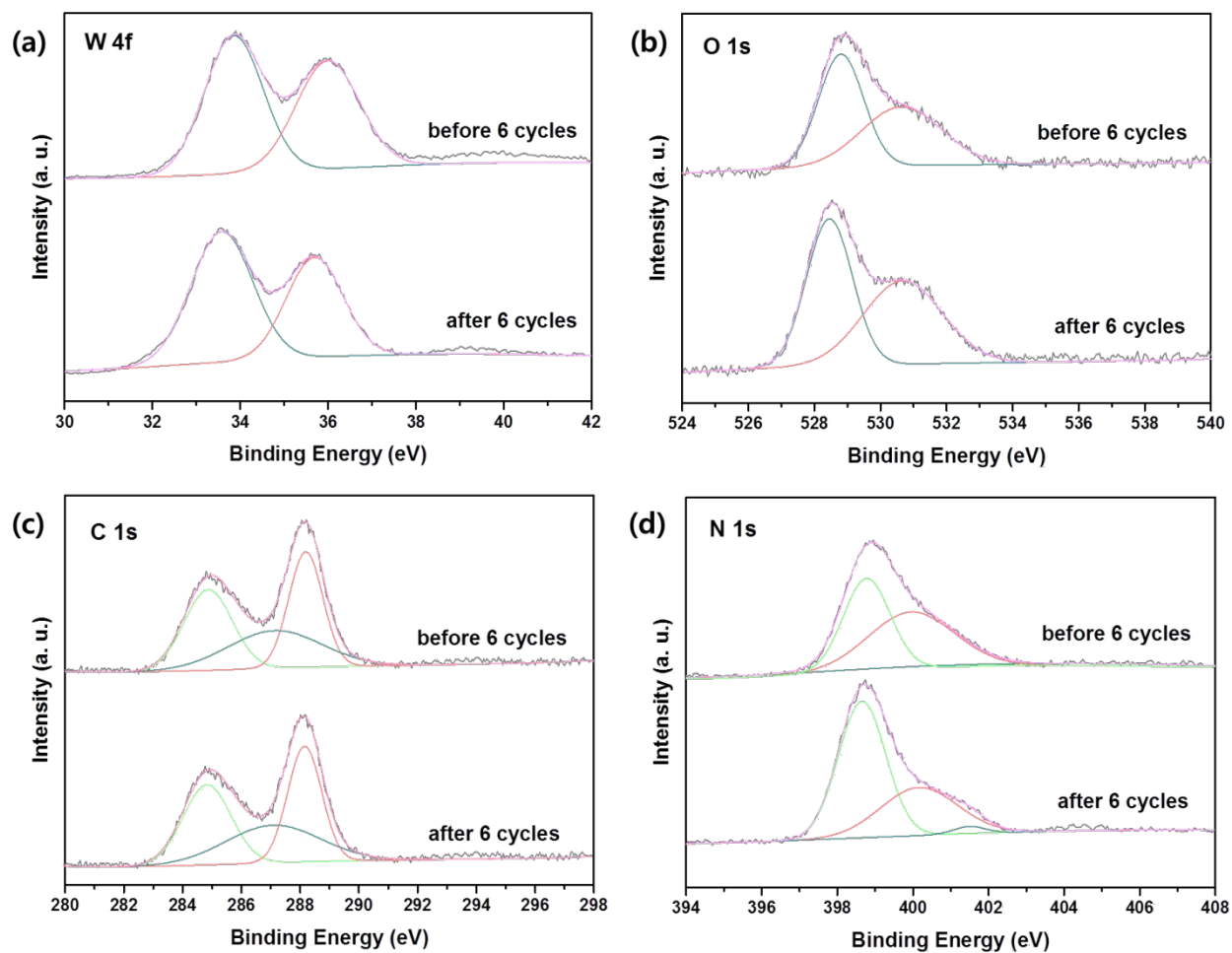


Figure S8. The high-resolution XPS spectra of (a) W 4f, (b) O 1s, (c) C 1s and (d) N 1s for $W_{18}O_{49}/Au/g-C_3N_4$ before and after cycling test.

Table S1. BET-specific surface areas of the samples.

Samples	BET surface area (m ² g ⁻¹)
g-C ₃ N ₄	7.10
W ₁₈ O ₄₉ /g-C ₃ N ₄	9.21
W ₁₈ O ₄₉ /Au/g-C ₃ N ₄	11.66

Table S2. Comparison of hydrogen photocatalytic activities of our photocatalyst with other Z-scheme photocatalysts reported in the last 1–2 years.⁶⁰⁻⁶⁷

Charge transfer Type	Heterojunction system	H ₂ production [μmol/g*h]	Reference (Year)
Z-scheme	This work (W ₁₈ O ₄₉ /Au/g-C ₃ N ₄)	3465	2021
	NiTiO ₃ /Cd _{0.5} Zn _{0.5} S	1058	[60], 2021
	CdS@ZnIn ₂ S ₄	540.3	[61], 2021
	Bi ₂ O ₂ CO ₃ /Bi ₂ WO ₆	664.5	[62], 2021
	NiS-PCN	1239.3	[63], 2021
	CdS/PI	613	[64], 2020
	Cu ₃ P/ZnIn ₂ S ₄	2561.1	[65], 2020
	MoS ₂ /CaTiO ₃	622.14	[66], 2020
	TiO ₂ -Au-CdS	669.7	[67], 2020