

Supplementary Material

Exploring the spatially resolved charge transfer mechanism in the Al-doped SrTiO₃/C₃N₅ S-scheme heterojunction for boosted solar-driven photocatalytic hydrogen evolution

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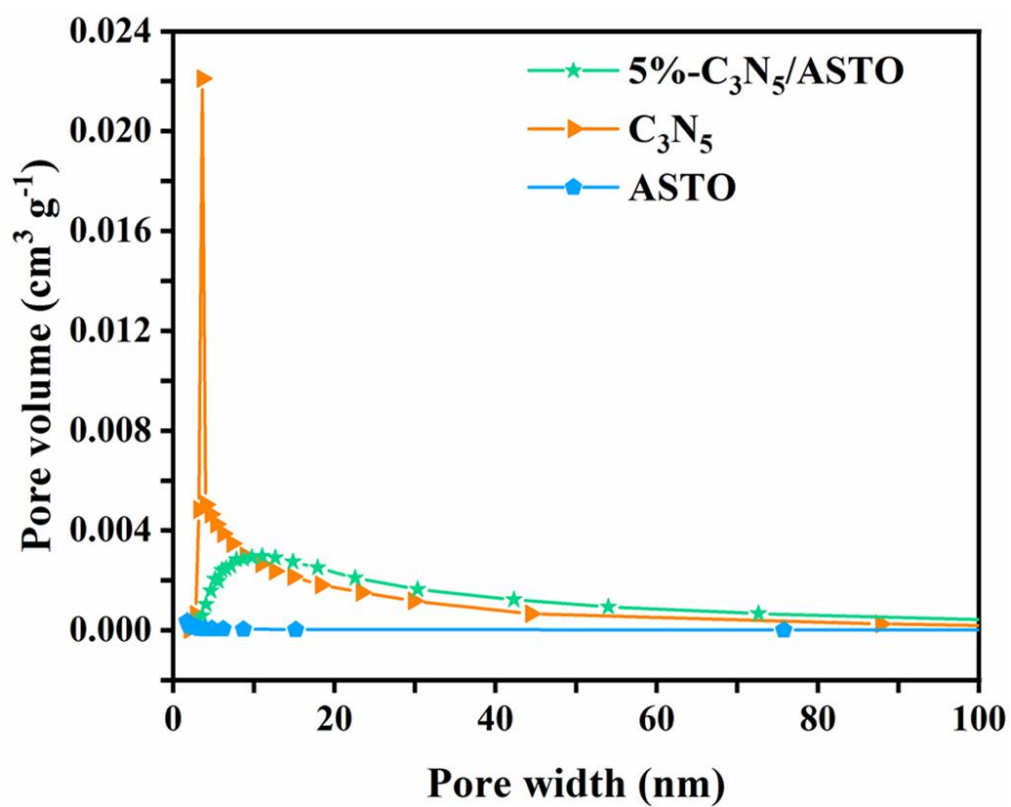


Fig. S1. The pore size distribution of C_3N_5 , ASTO, and 5%-ASTO/ C_3N_5 according to N_2 adsorption isotherms.

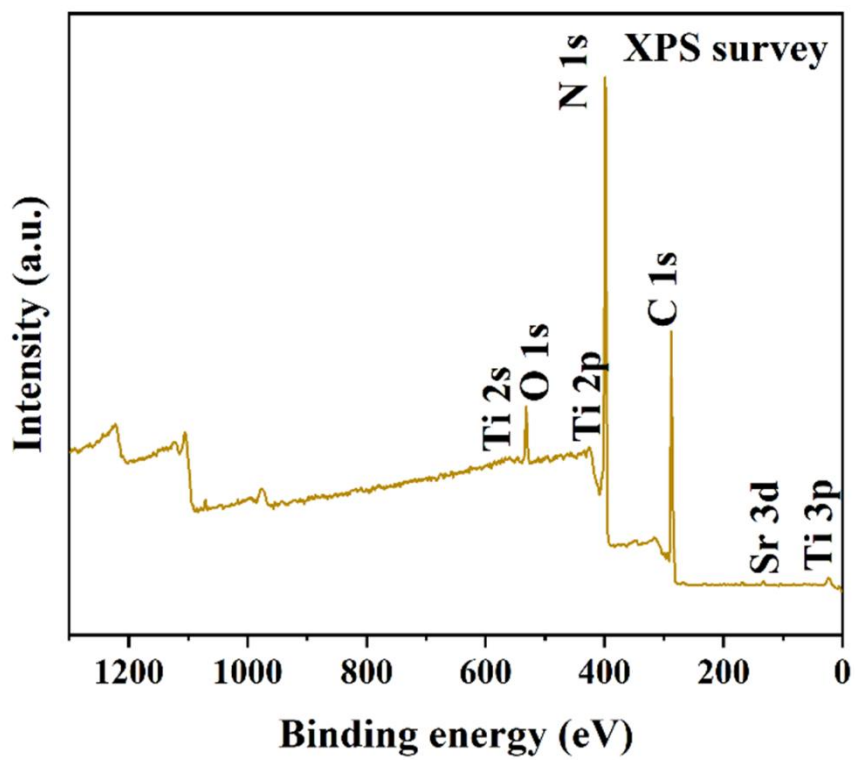


Fig. S2. XPS survey spectrum of 5%-ASTO/C₃N₅ heterostructure sample.

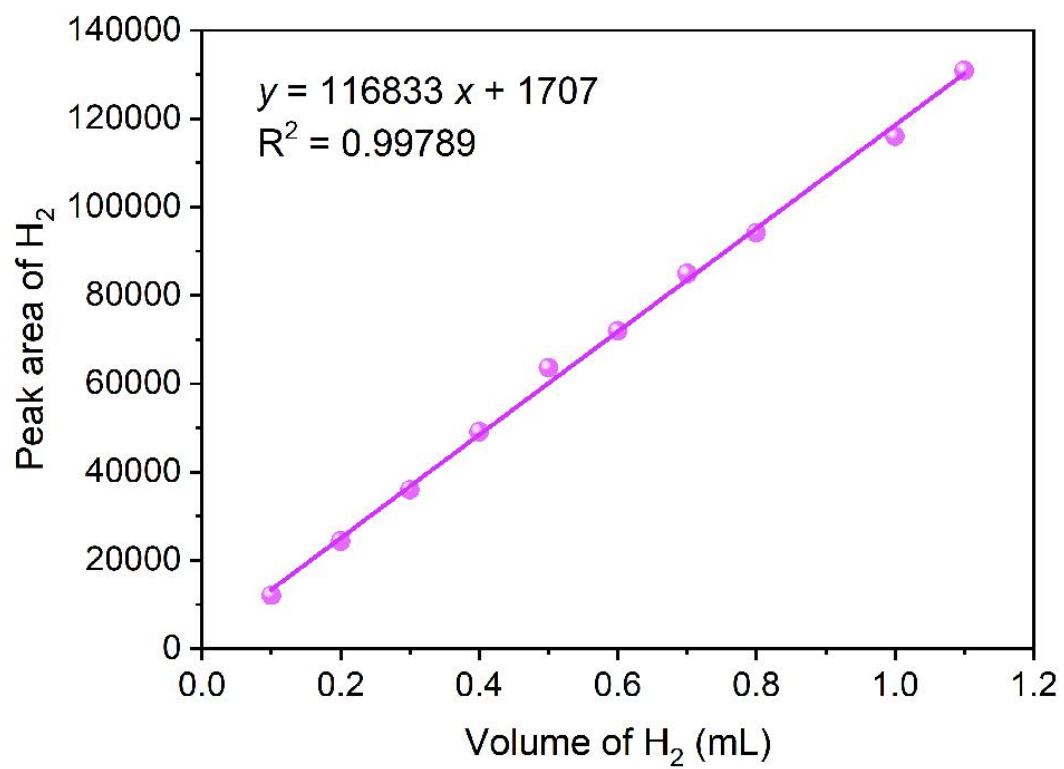


Fig. S3. The standard curve of H₂ production.

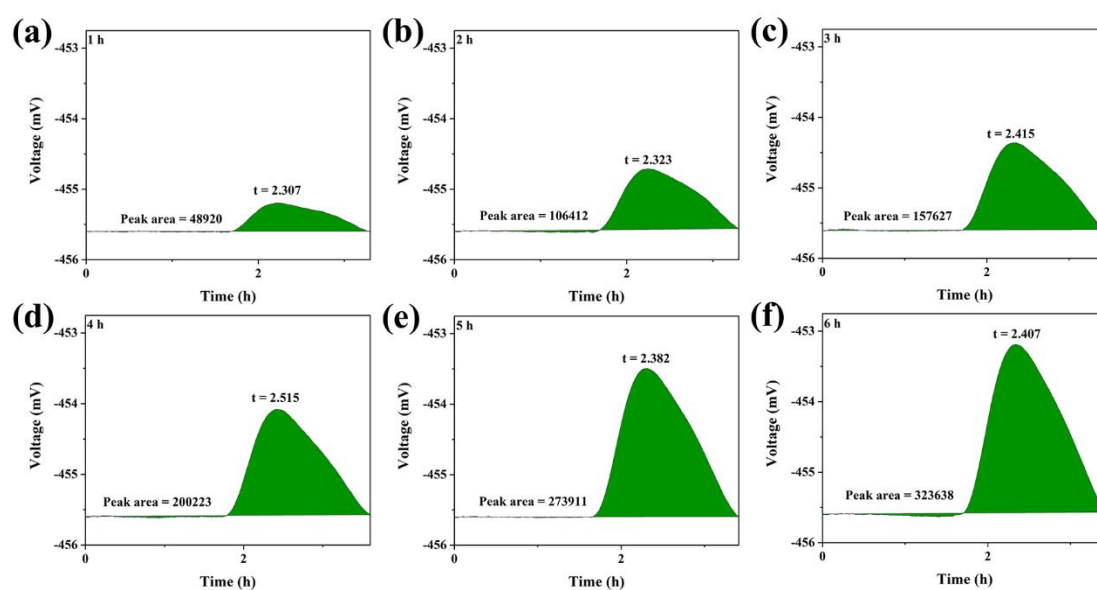


Fig. S4. Hydrogen gas chromatogram evolved over C_3N_5 .

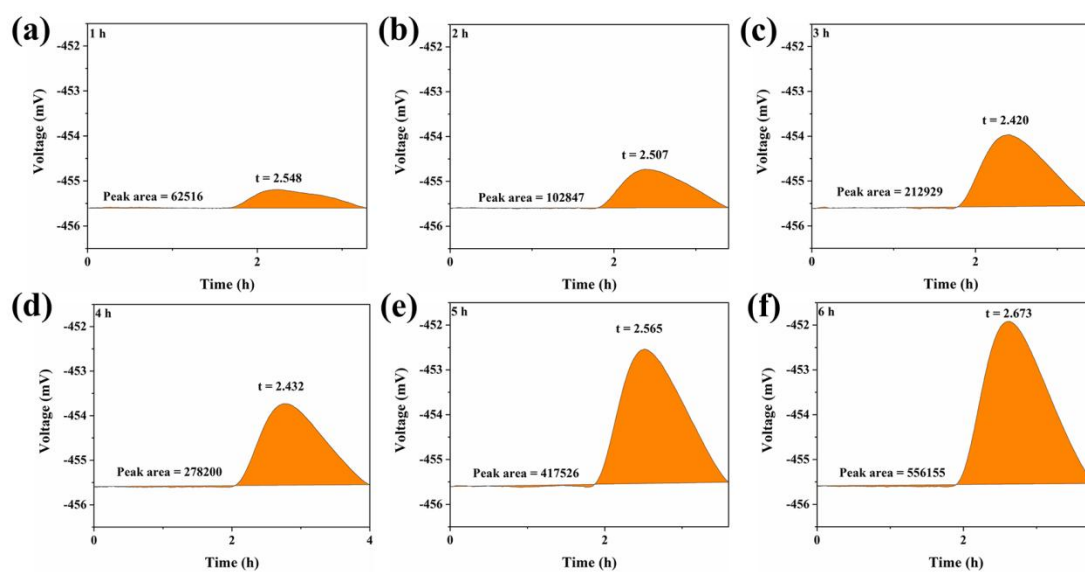


Fig. S5. Hydrogen gas chromatogram evolved over 1%-ASTO/C₃N₅.

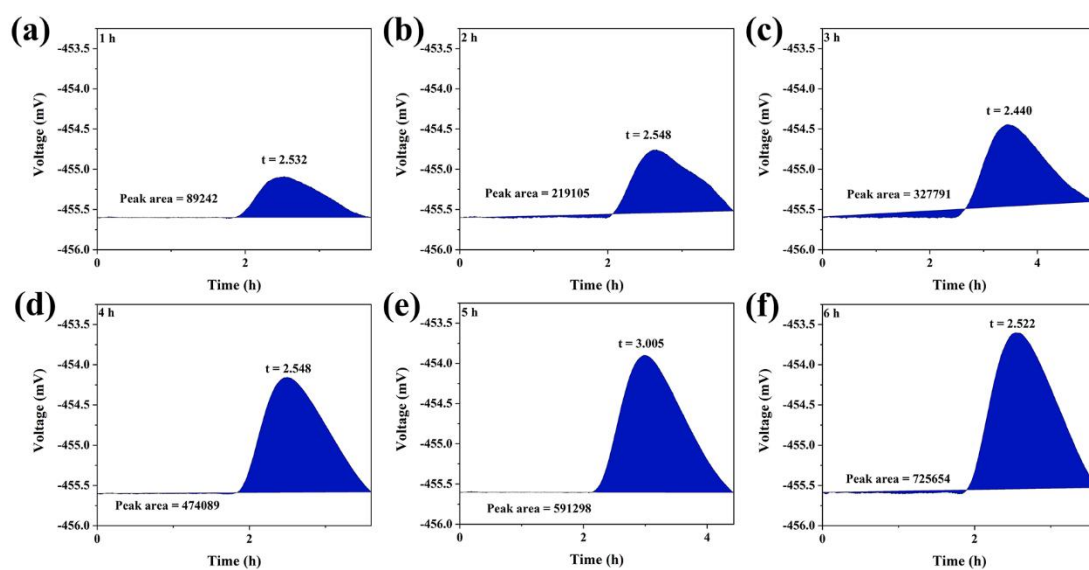


Fig. S6. Hydrogen gas chromatogram evolved over 3%-ASTO/C₃N₅.

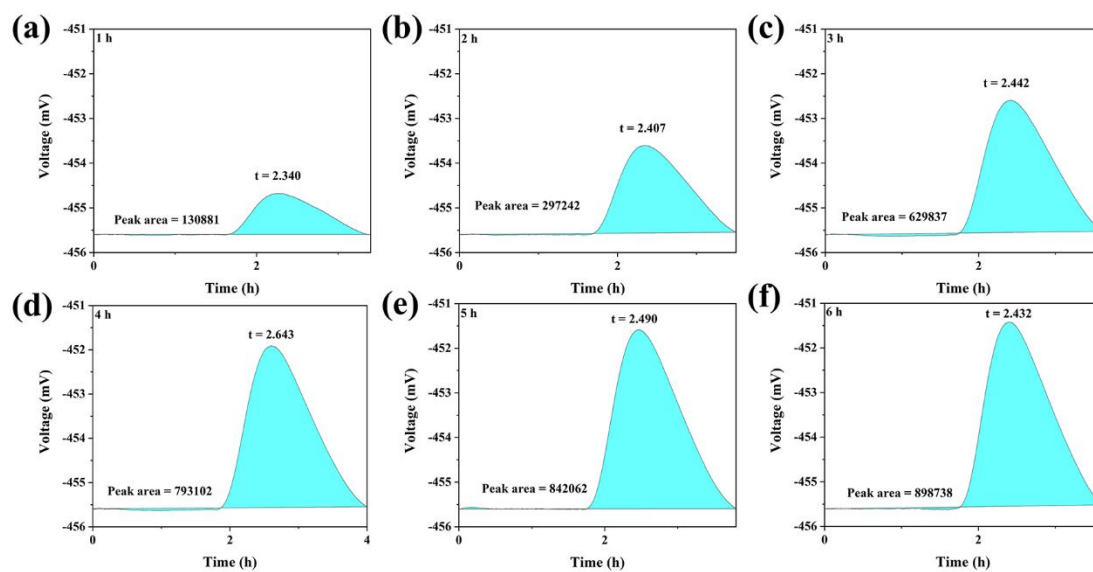


Fig. S7. Hydrogen gas chromatogram evolved over 5%-ASTO/C₃N₅.

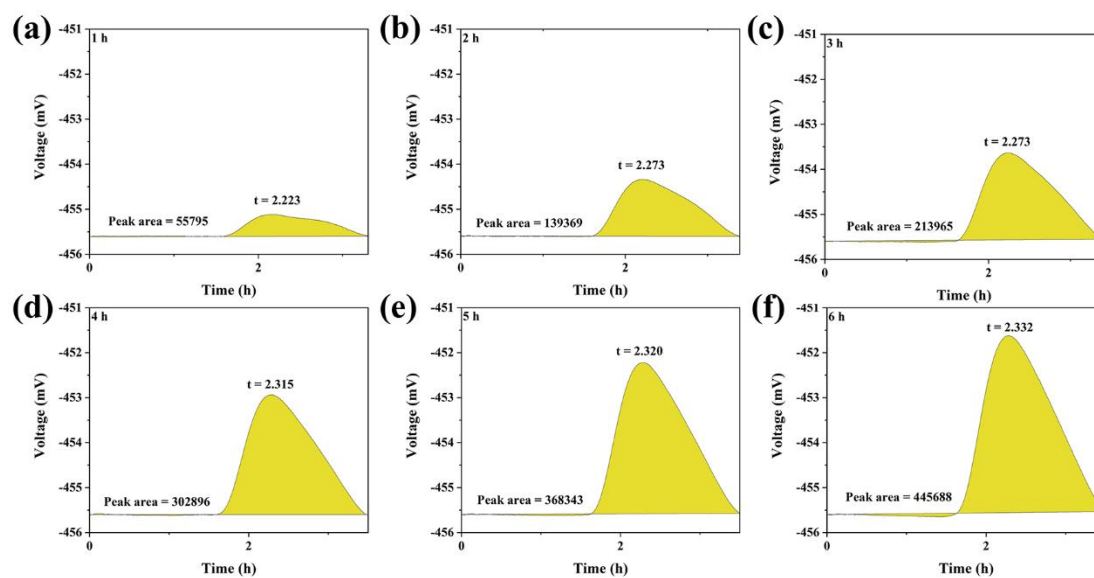


Fig. S8. Hydrogen gas chromatogram evolved over 7%-ASTO/C₃N₅.

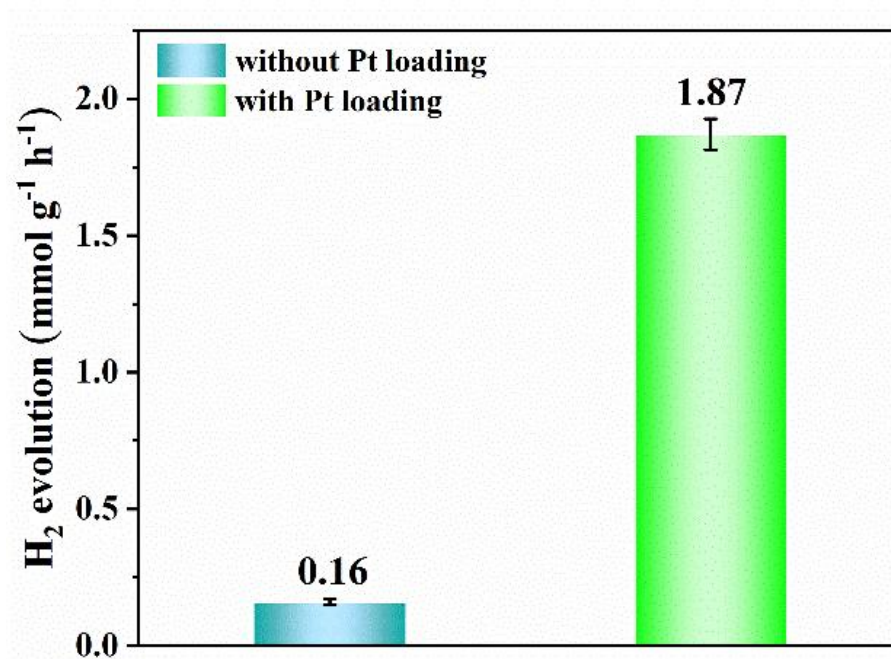


Fig. S9. Histogram of hydrogen production rates of 5%-ASTO/C₃N₅ with and without Pt as a cocatalyst.

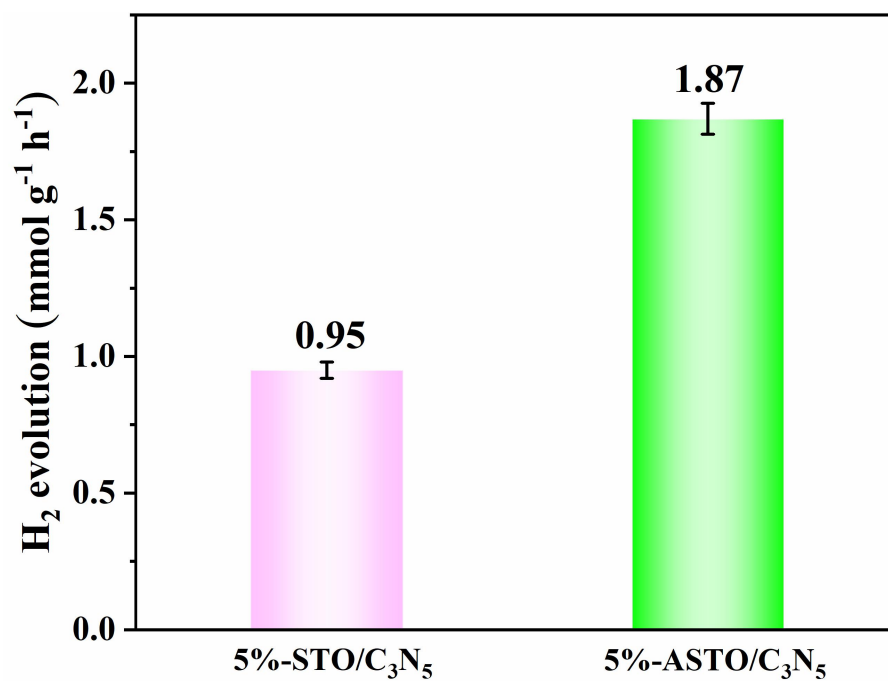


Fig. S10. A comparison of hydrogen production rates of 5%-ASTO/C₃N₅ and 5%-STO/C₃N₅.

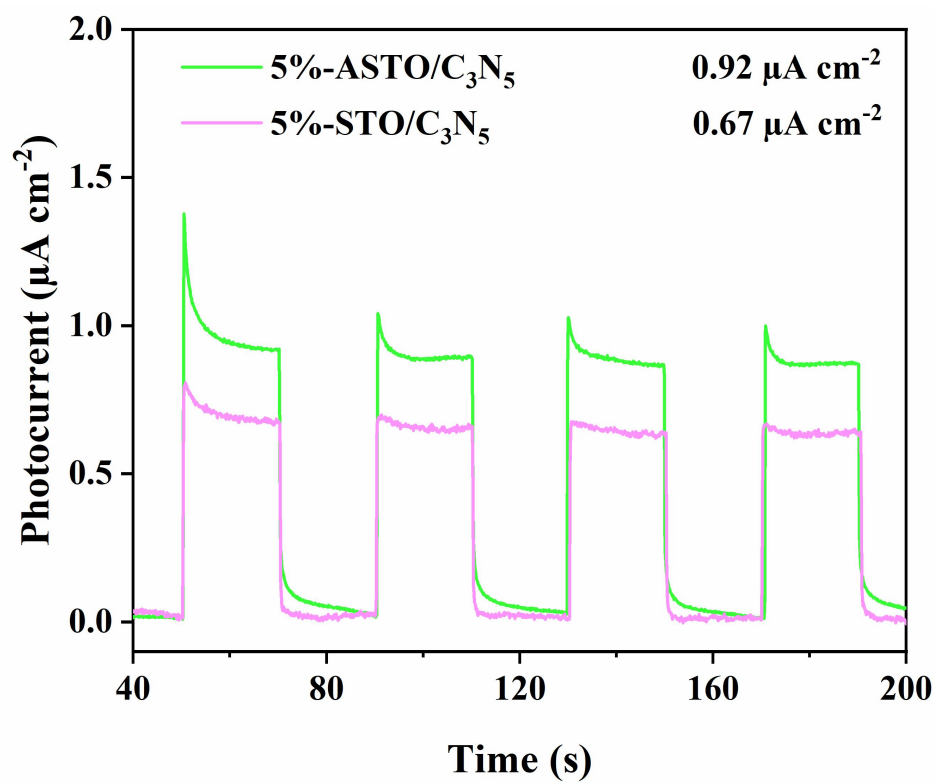


Fig. S11. A comparison of photocurrent of 5%-ASTO/C₃N₅ and 5%-STO/C₃N₅.

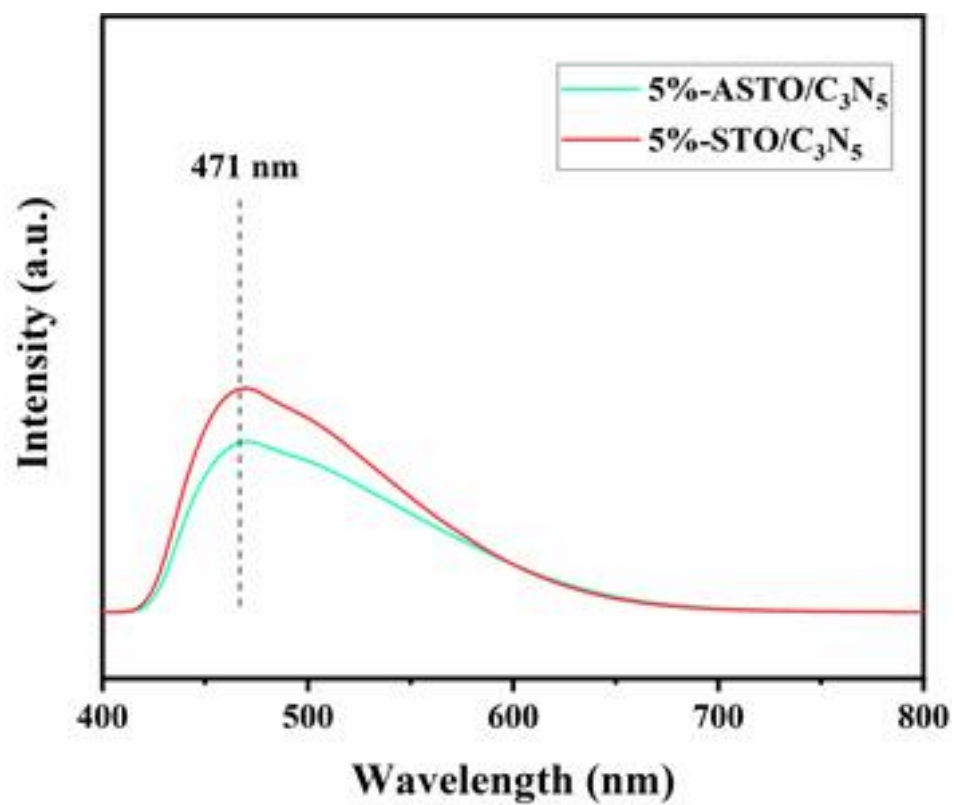


Fig. S12. A comparison of PL spectra of 5%-ASTO/C₃N₅ and 5%-STO/C₃N₅.

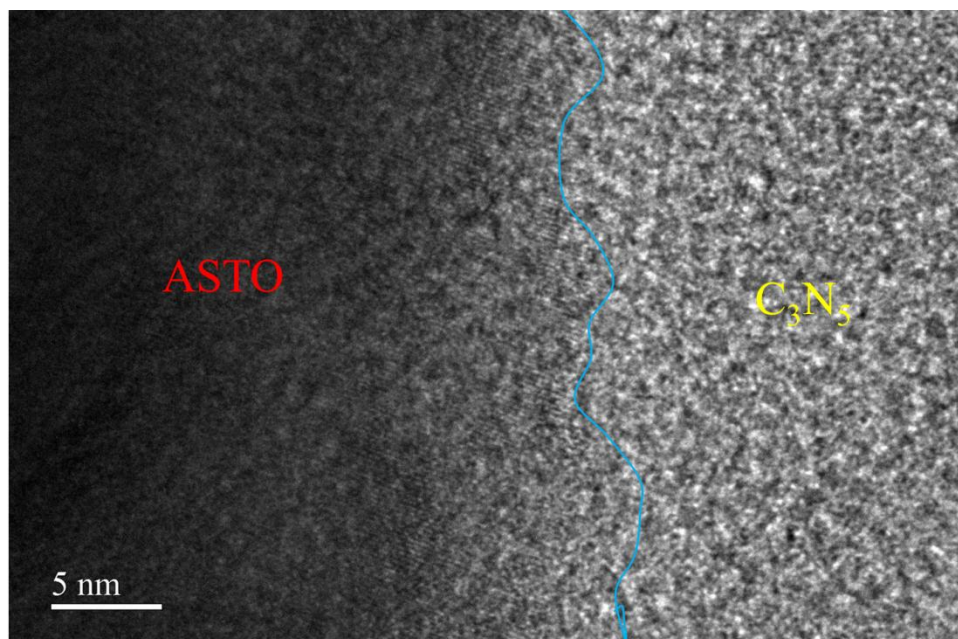


Fig. S13. HRTEM image of the spent 5%-ASTO/C₃N₅ catalyst after 5 cycles.

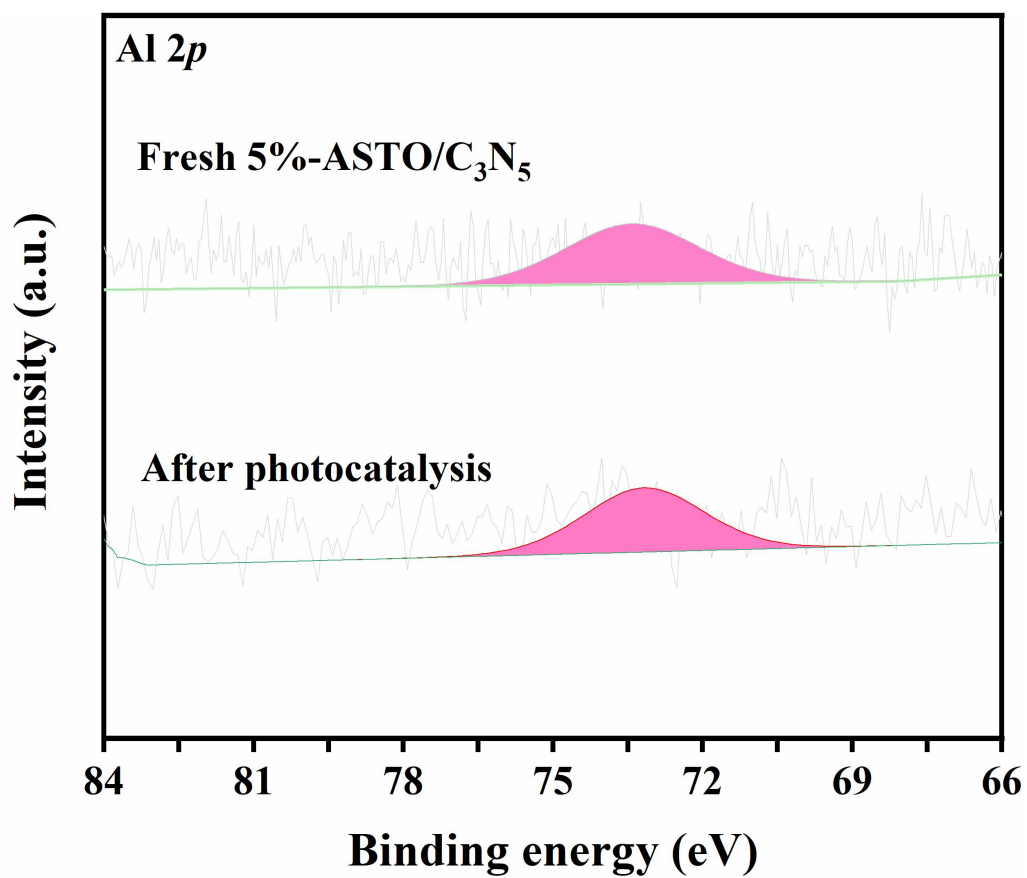


Fig. S14. A comparison of high-resolution XPS spectra of Al 2*p* before and after photocatalysis.

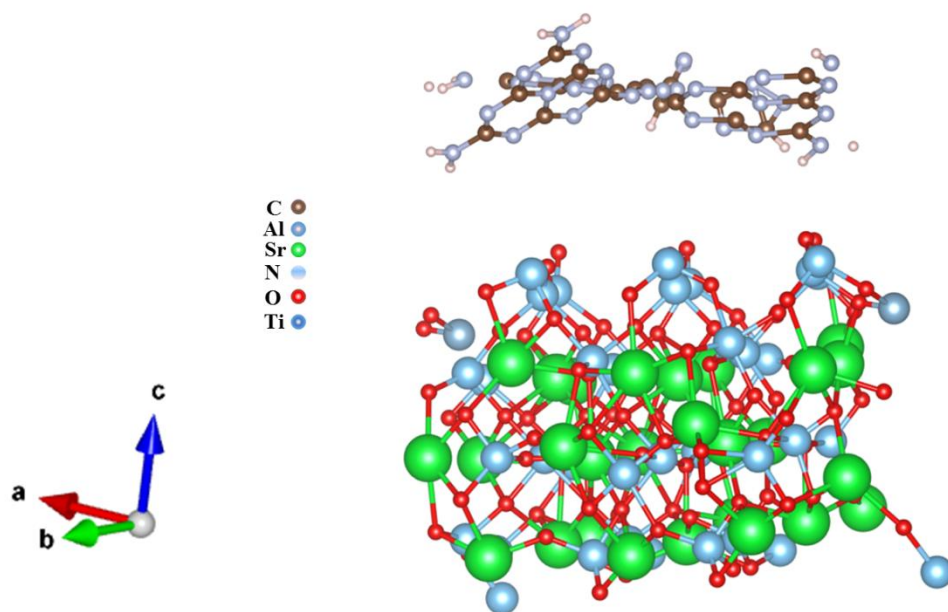


Fig. S15. The structural model of the ASTO (110)/C₃N₅ (001) interface before geometric optimization.

Table S1. BET specific surface area, pore volume, and average pore size of C₃N₅, ASTO, and 5%-ASTO/C₃N₅ samples.

Sample	BET specific surface area (m ² g ⁻¹)	Pore volume (cm ³ g ⁻¹)	Average pore size (nm)
ASTO	4.96	0.011	8.27
C ₃ N ₅	30.06	0.095	15.07
5%-ASTO/C ₃ N ₅	45.76	0.183	16.03