Three-Dimensional Pyrrolo[3,2-*b*]pyrrole-Based Covalent Organic Polymers for Continuous H_2O_2 Production

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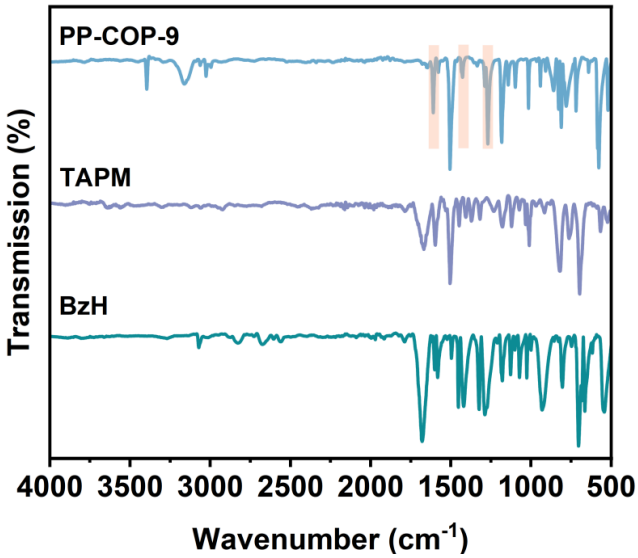


Figure S1. FT-IR spectra of as-prepared PP-COP-**9**, TAPM and BzH.

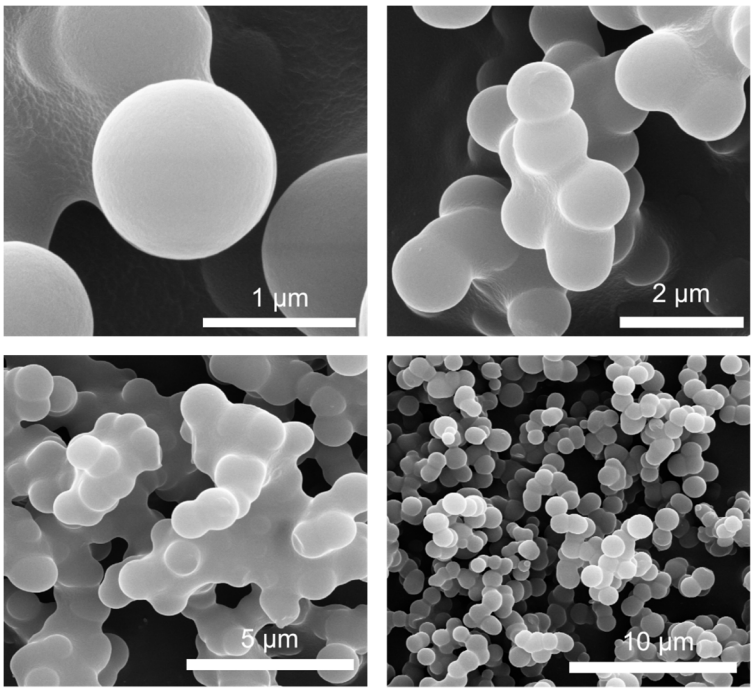


Figure S2. Scanning electron microscopy images (SEM) of PP-COP-**9**.

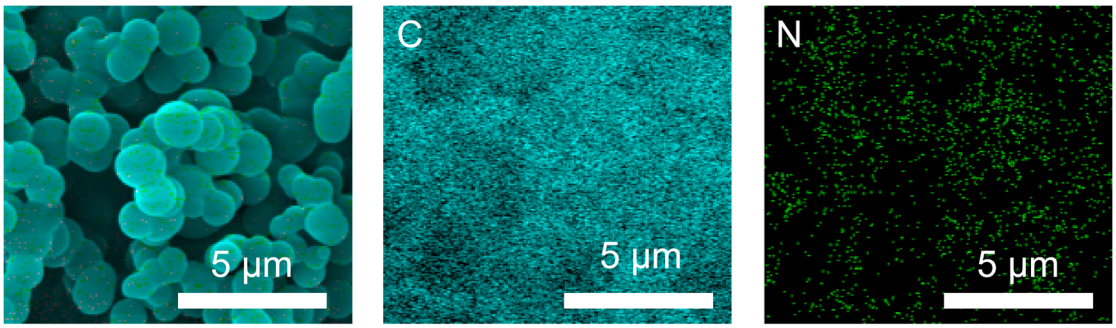


Figure S3. EDS mapping of PP-COP-**9**.

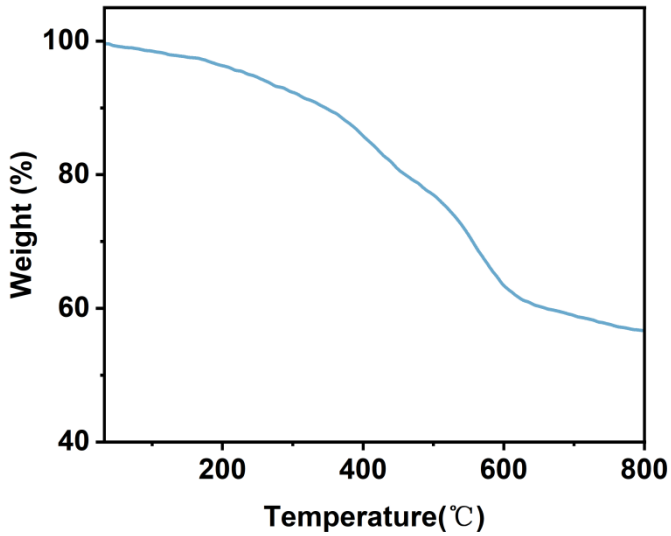


Figure S4. TGA curves of PP-COP-**9** under a N_2 atmosphere.

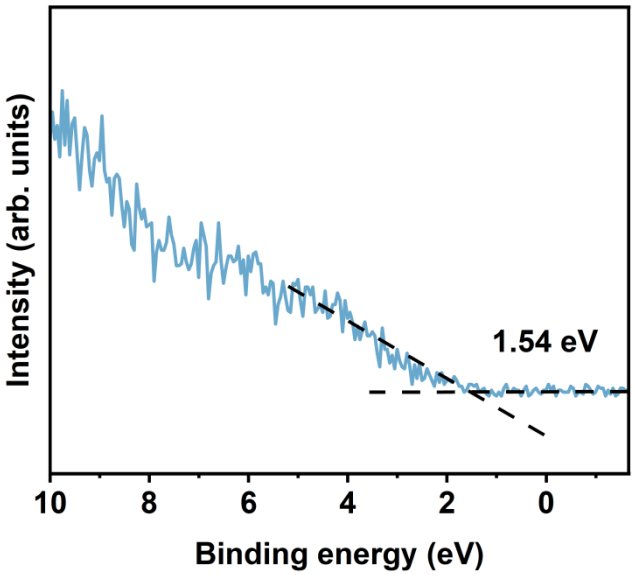


Figure S5. XPS valence band spectra of PP-COP-**9**.

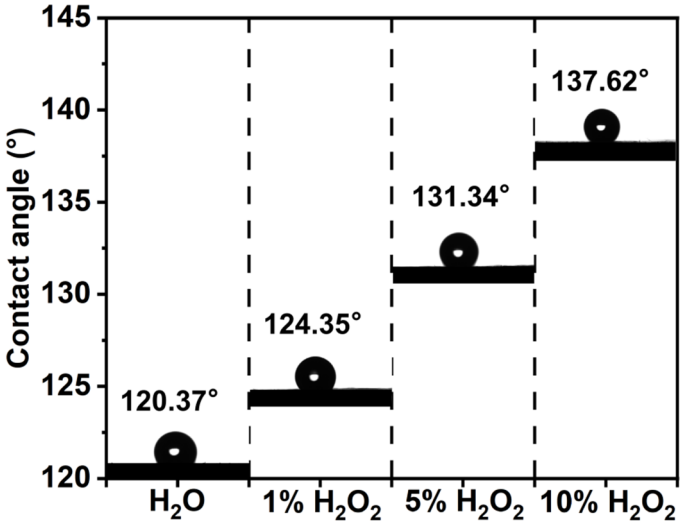


Figure S6. Water contact angle measurements of PP-COP-**9**.

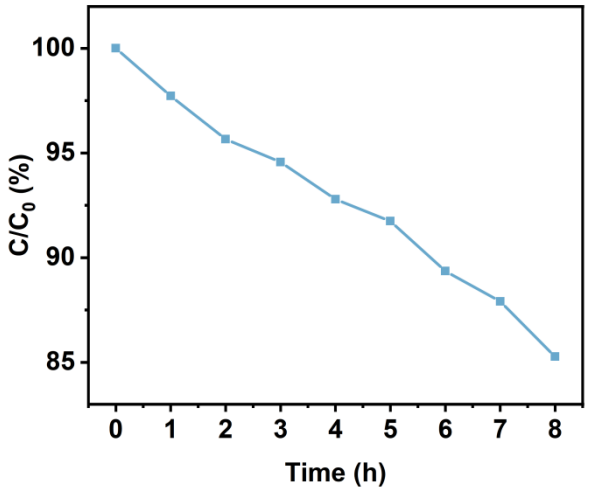


Figure S7. Photocatalytic H_2O_2 decomposition experiments in water with an initial H_2O_2 concentration of 1 mM.

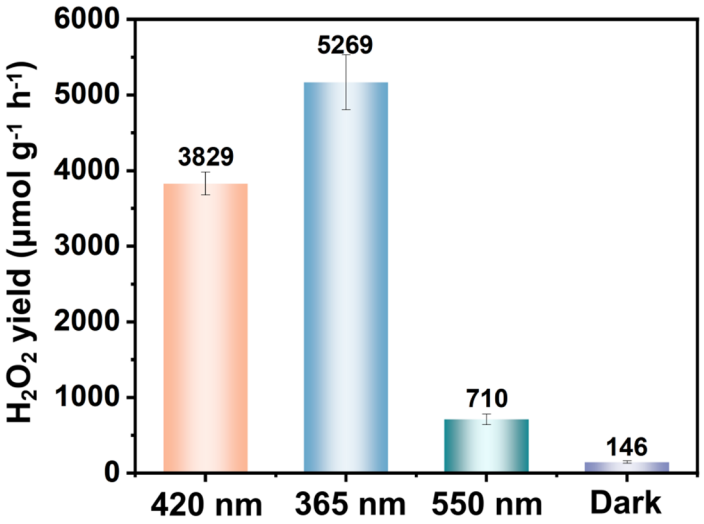


Figure S8. Wavelength-dependent H_2O_2 yield rates for PP-COP-**9**. (Test conditions: 3 mg photocatalyst, 30 mL of pure water, O_2 atmosphere, 300 W Xe lamp).

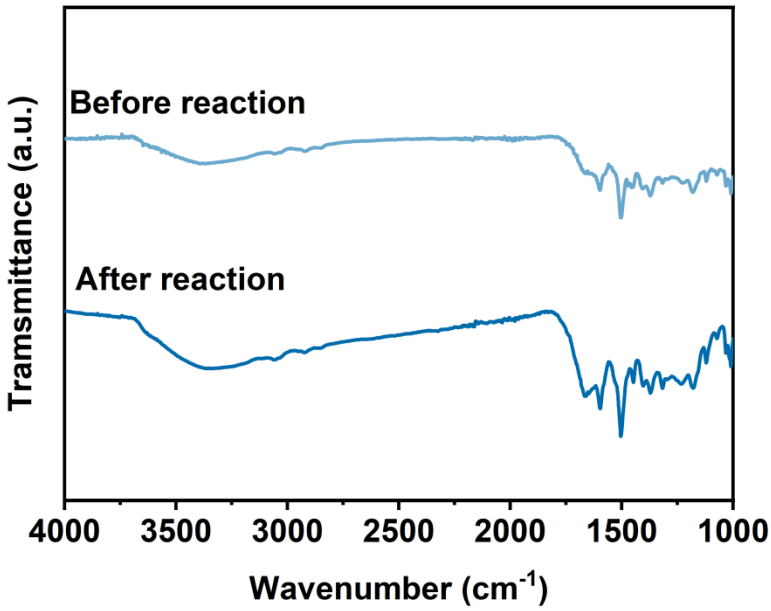


Figure S9. FTIR spectra of PP-COP-**9** before and after the photocatalytic reaction.

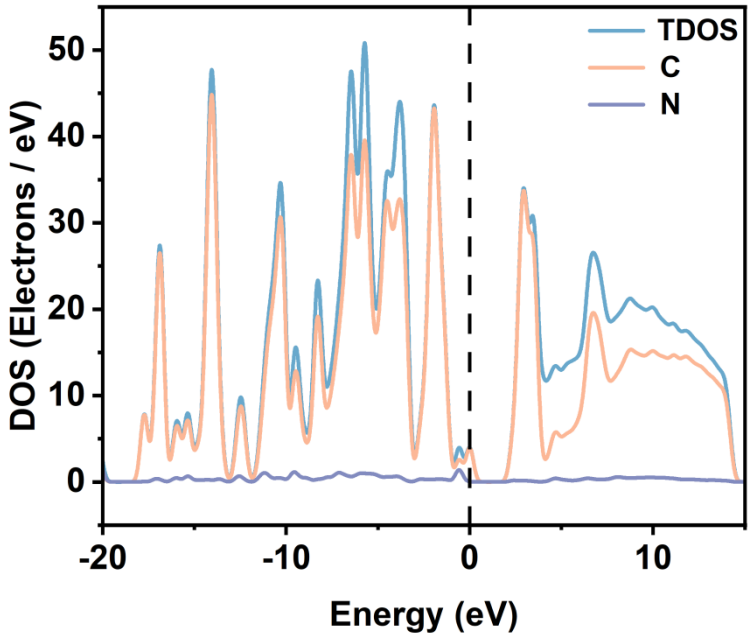


Figure S10. Density of states (DOS) analysis of PP-COP-**9**.

Table S1. The performance of PP-COPs in photocatalytic production of H_2O_2, as compared to the most advanced photocatalysts reported to date.

Catalyst	Reaction solution	Irradiation conditions (nm)	H_2O_2 production rate (μmol g^{-1} h^{-1})	Ref.
PP-COP-9	H_2O	λ≥365	5269	This work
PP-COP-9	H_2O:BA=9:1	λ≥365	118936	This work
BT-Bph-COF	H_2O	λ≥420	1310	[1]
TMN-COF	H_2O	λ ≥ 420	1330	[2]
DTTA-TMT	H_2O	λ > 420	1544	[3]
TA-TMT	H_2O	λ≥420	1840	[3]
Tz-QH-COF	H_2O	λ>420	1874	[4]
P-PTAQ	H_2O	λ≥420	2692	[5]
Th-CMP	H_2O	λ≥400	4027	[6]

CZ-AQ	H_2O	λ≥400	4401	[7]
BPT-COF	H_2O:BA=9:1	λ≥420	5570	[8]
BTT-PhPD	H_2O:BA=9:1	λ≥420	6650	[9]
COF-300-D-F	H_2O:BA=9:1	λ≥420	10090	[10]
MQ-BT	H_2O: BA=10:1	λ>420	16892	[11]
PzTP@BTPT	H_2O:BnOH=9:1	λ=460	20490	[12]
XJU-4	H_2O: BA=10:1	λ≥420	24605	[13]
sp^3-SF-AQ	H_2O: BA=9:1	λ≥400	26640	[14]
TTT-COF	H_2O:BA=9:1	λ>420	29900	[15]

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