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Enhanced photocatalytic hydrogen peroxide production activity of imine-linked covalent organic frameworks via modification with functional groups

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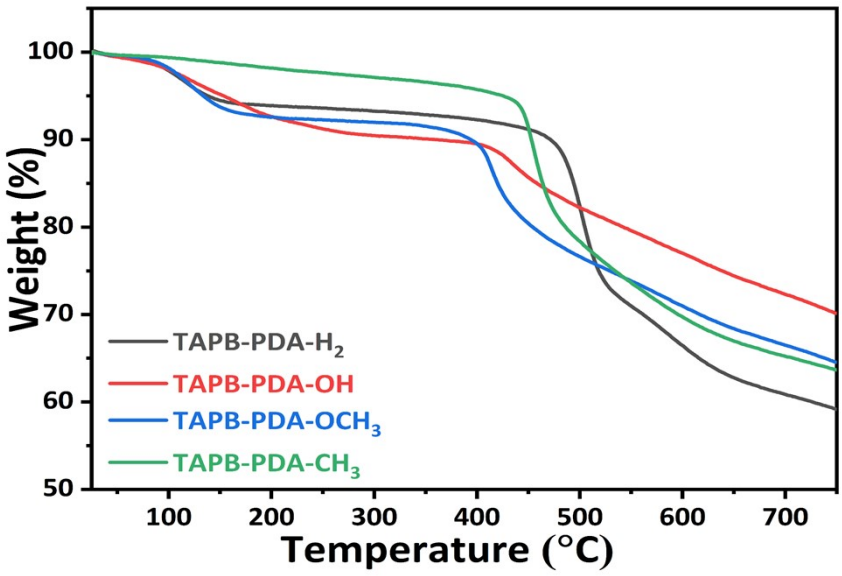

Fig. S1. TGA curve of TAPB-PDA-X

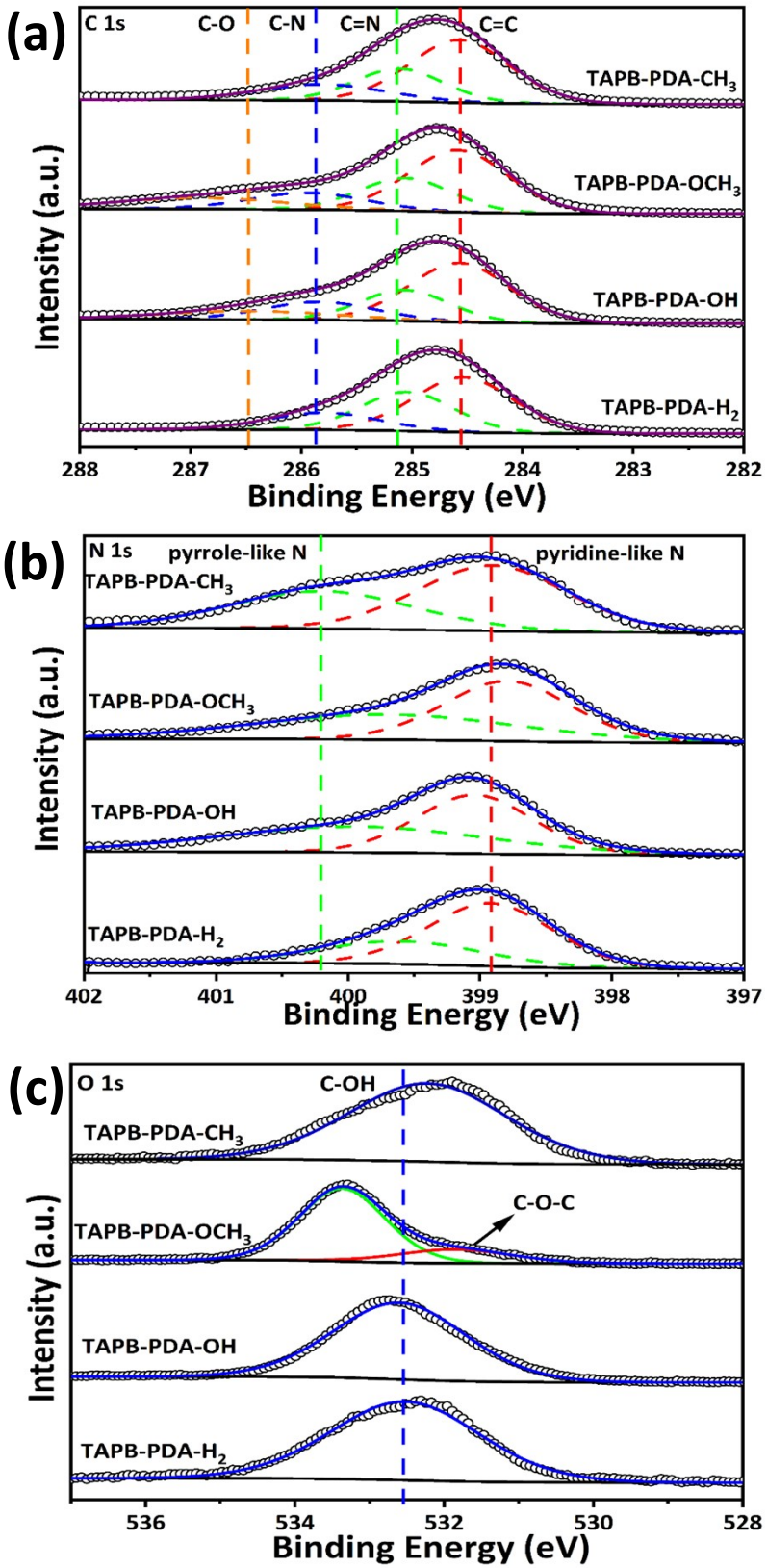

Fig. S2. (a) C 1s XPS spectra; (b) N 1s XPS; (c) O 1s XPS spectra of TAPB-PDA-X

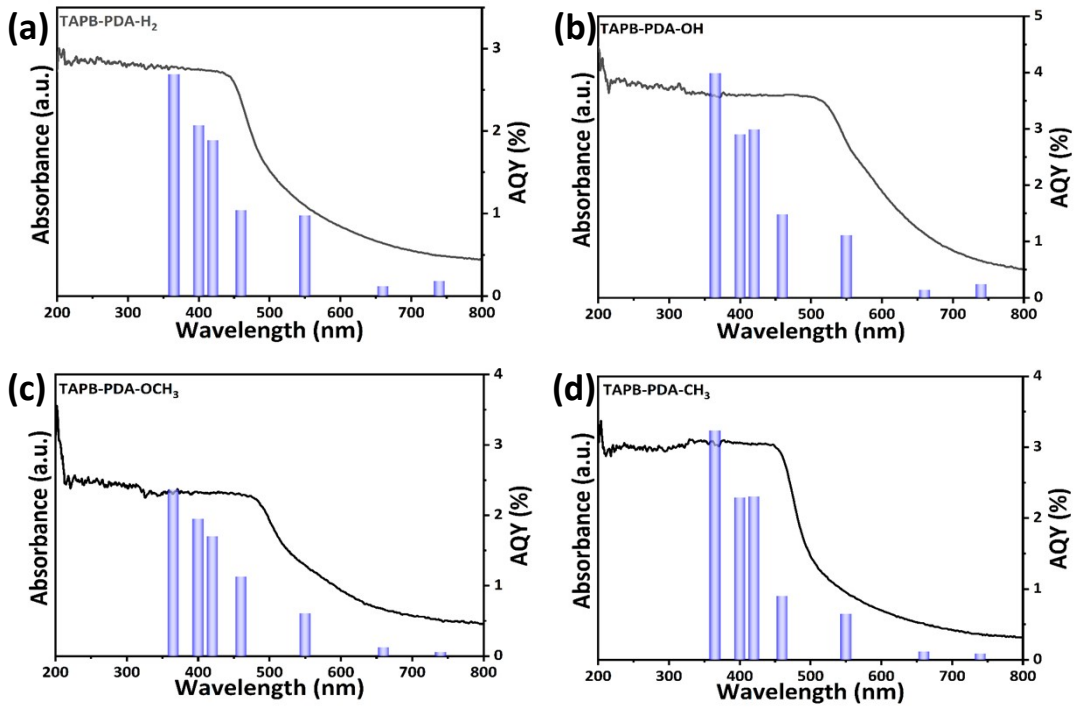

Fig. S3. AQY values of TAPB-PDA-X under different monochromatic light irradiation and UV-visible DRS spectra

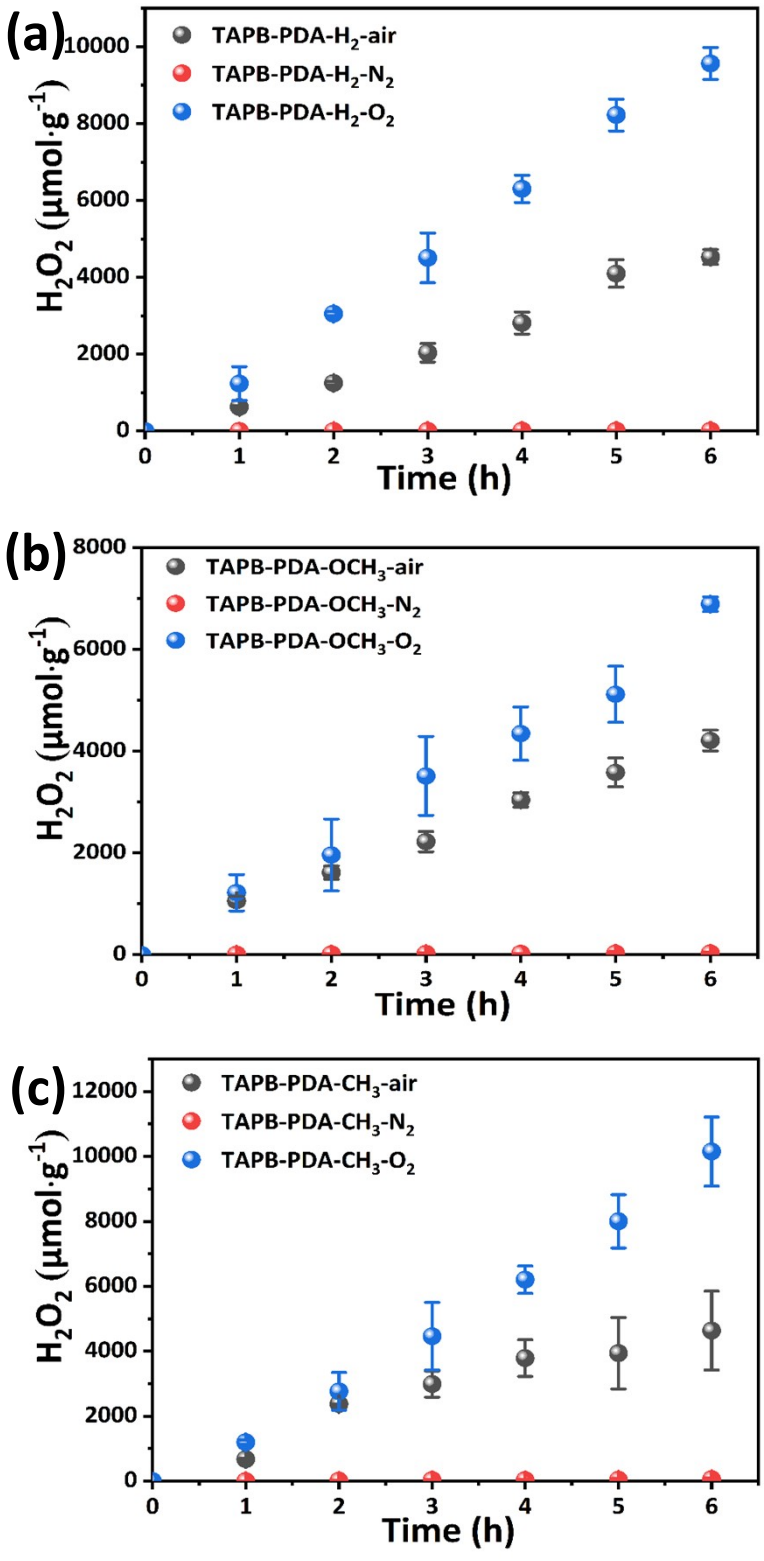

Fig. S4. Photocatalytic production of H_2O_2 by (a) TAPB-PDA-H_2, (b) TAPB-PDA-OCH_3 and (c) TAPB-PDA-CH_3 under different atmosphere conditions (Condition: 5 mg catalyst, 10 mL H_2O/EtOH (v:v=9:1), LED light (λ > 420 nm))

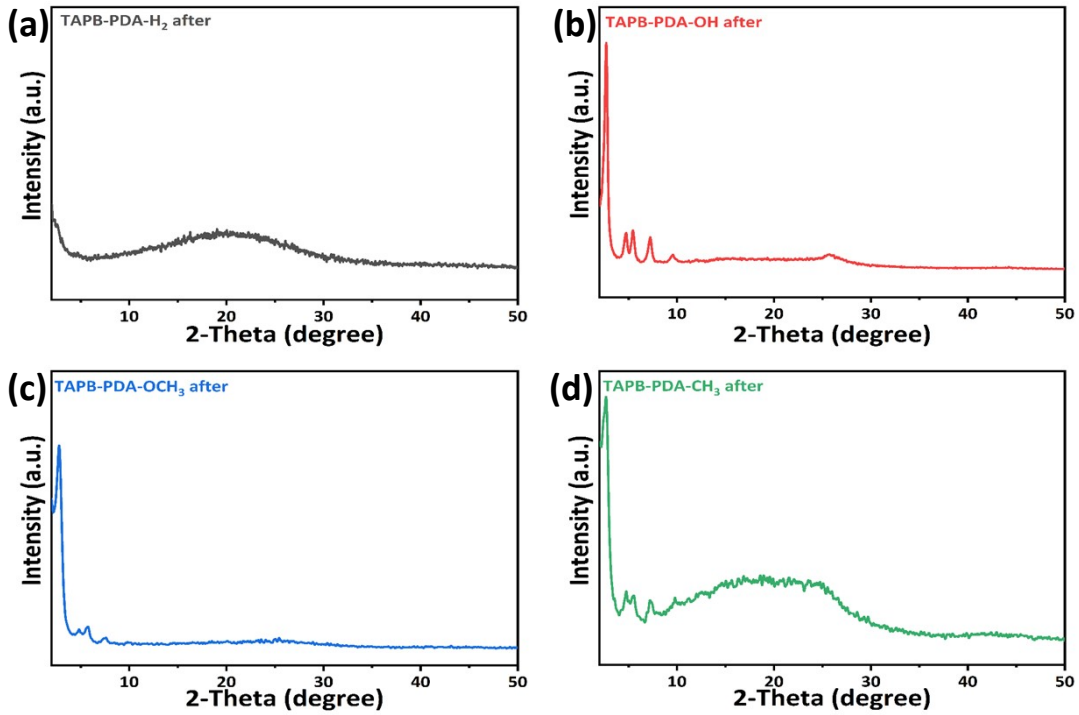

Fig. S5. XRD pattern of (a) TAPB-PDA-H_2, (b) TAPB-PDA-OH, (c) TAPB-PDA-OCH_3 and (d) TAPB-PDA-CH_3 after photocatalytic reaction

Table S1. XPS analyses of C-OH bonding molar percentage

Sample	C-OH bonding molar percentage (%)
TAPB-PDA-H_2	4.38
TAPB-PDA-OH	10.39
TAPB-PDA-OCH_3	7.28
TAPB-PDA-CH_3	6.46

Table S2. Comparison of photocatalytic H_2O_2 production with other COFs

Samples	H_2O_2	AQY (%)	Solvent	References
TAPD-$(Me)_2$COF	234.52 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O:EtOH (1:9)	[1]
CHF-DPDA	256 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	16.0 (420nm)	H_2O	[2]
TPB-DMTP-COF	2882 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O	[3]
CTF-NS-5BT	1630 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O:BA (9:1)	[4]
COF-TfpBpy	1970 ($\mu mol \cdot L^{-1} \cdot h^{-1}$)	8.1 (420nm)	H_2O	[5]
TpMa/CN-5	880.46 ($\mu mol \cdot L^{-1}$)	-	H_2O:IPA (9:1)	[6]
TF_{50}-COF	1739 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	5.1 (400 nm)	H_2O: EtOH (9:1)	[7]
TAPB-PDA-H_2	1545.3 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	1.89 (420 nm)	H_2O:EtOH (9:1)	This work
TAPB-PDA-OH	2117.6 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	2.99 (420 nm)	H_2O:EtOH (9:1)	This work
TAPB-PDA-OCH_3	1148.2 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	1.70 (420 nm)	H_2O:EtOH (9:1)	This work
TAPB-PDA-CH_3	1691.6 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	2.31 (420 nm)	H_2O:EtOH (9:1)	This work
TAPB-PDA-H_2	1349.3 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O	This work
TAPB-PDA-OH	1841.3 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O	This work

Samples	H_2O_2	AQY (%)	Solvent	References
TAPB-PDA-OCH_3	869.1 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O	This work
TAPB-PDA-CH_3	857.8 ($\mu mol \cdot g^{-1} \cdot h^{-1}$)	-	H_2O	This work

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