Electronic Supplementary Material (ESI) for New Journal of Chemistry.

The K-doped g-C_3N_4 decorated with Ti_3C_2 for efficient photocatalytic H_2O_2 production

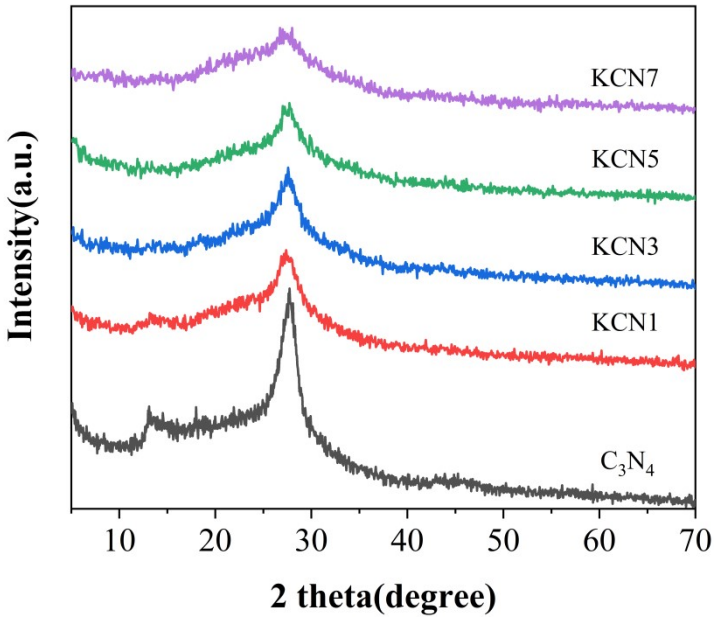

Figure S1. XRD patterns of KCN at different amounts.

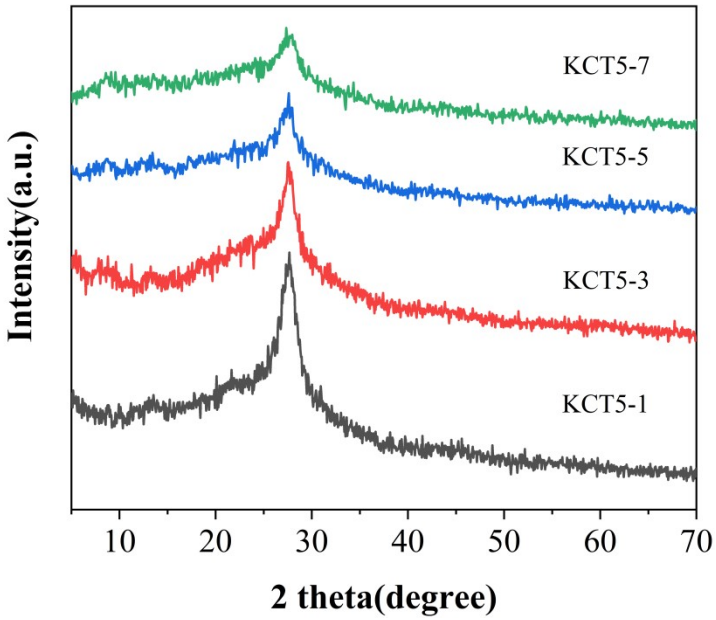

Figure S2. XRD patterns of KCT5-X at different amounts.

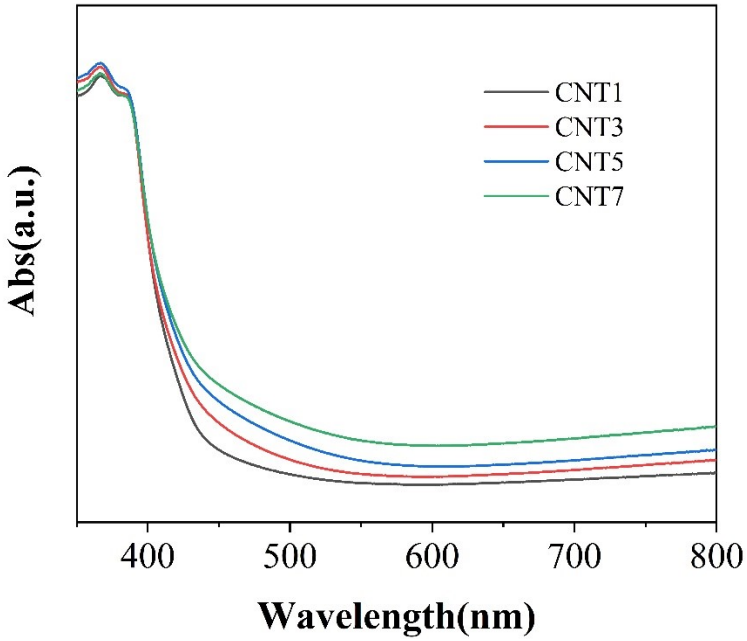

Figure S3. UV-visible diffuse reflection spectrum of CNTX.

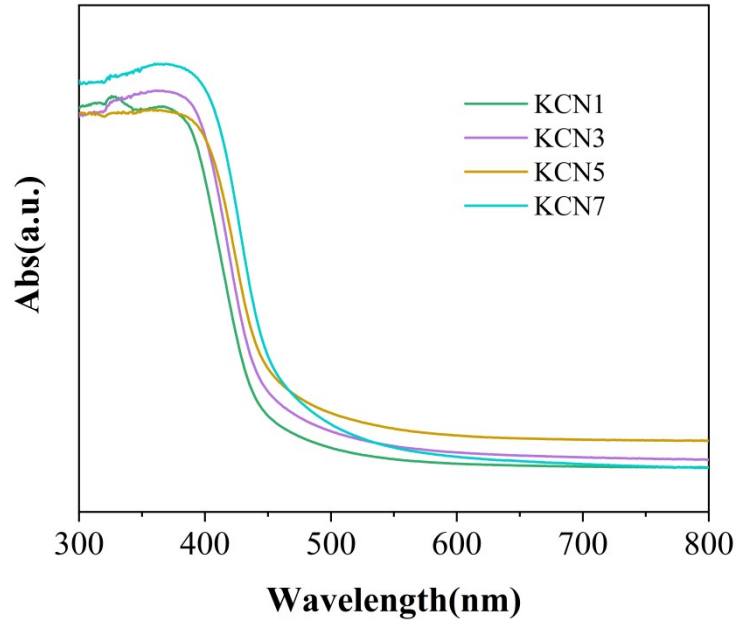

Figure S4. UV-visible diffuse reflection spectrum of KCNX.

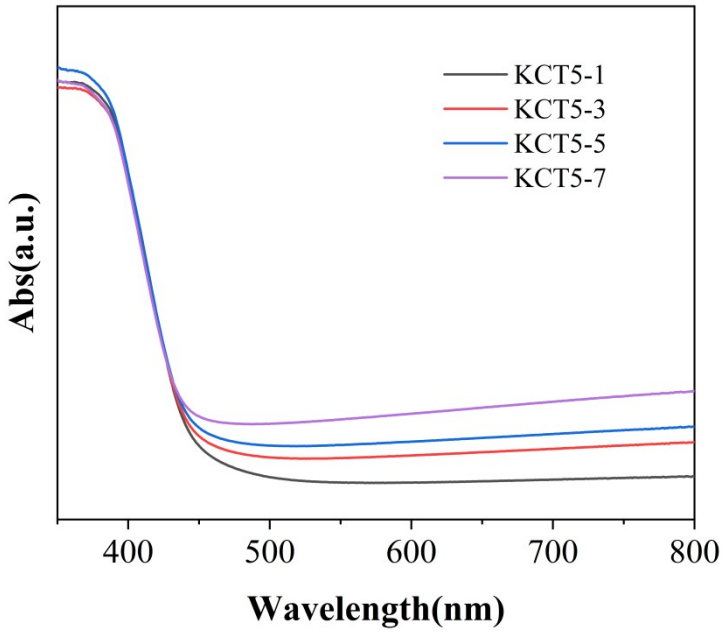

Figure S5. UV-visible diffuse reflection spectrum of KCT5-X.

Table S1. Specific surface area, pore volume and average pore size of g-C3N4, CNT5, KCN5, KCT5-5

Sample	S_{BET} (m^2/g)	Pore volume (cm^3/g)	Average pore size (nm)
g-C3N4	81.77	0.51	21.26
CNT5	59.13	0.29	25.35
KCN5	22.10	0.11	21.29
KCT5-5	25.76	0.12	19.73

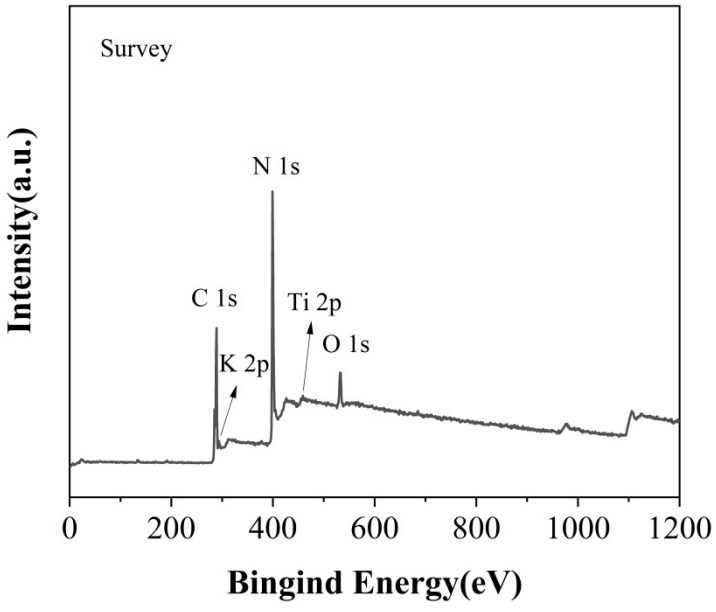

Figure S6. XPS spectra of KCT5-5 sample

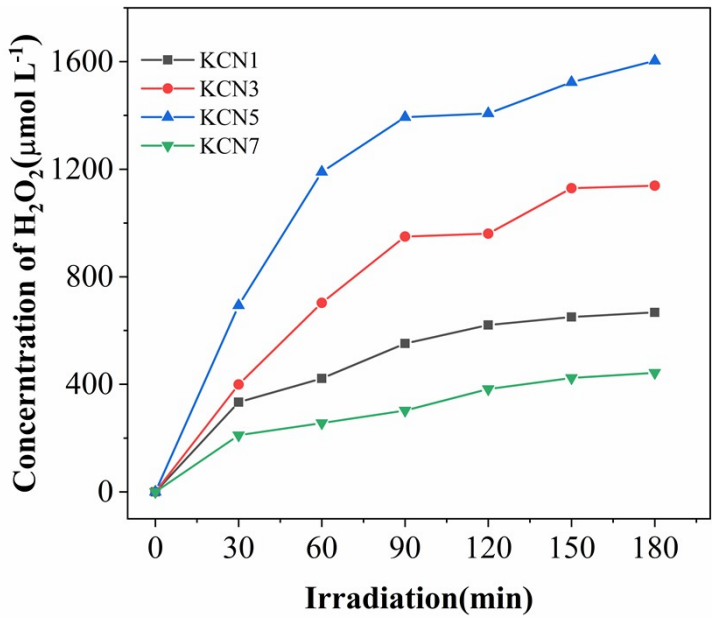

Figure S7. Photocatalytic H_2O_2 production under visible light irradiation at KCNX.

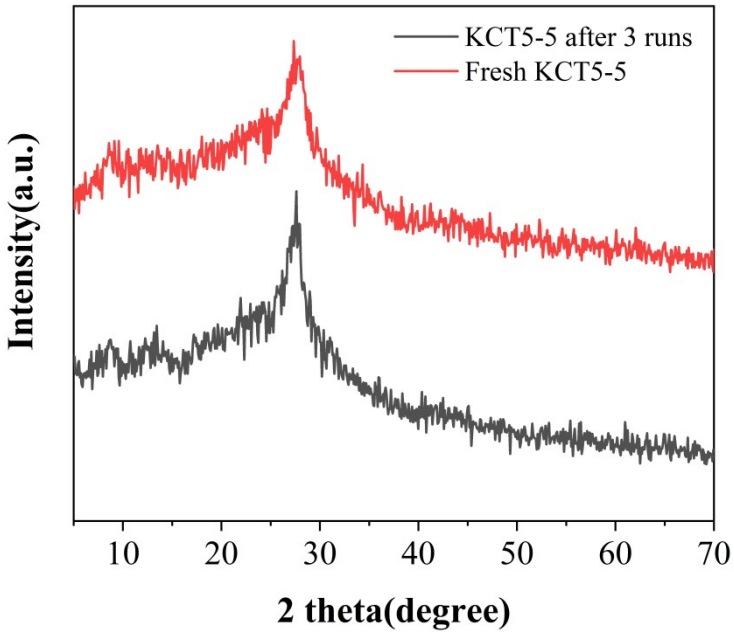

Figure S8. XRD patterns of KCNT5-5 before and after cycle testing.

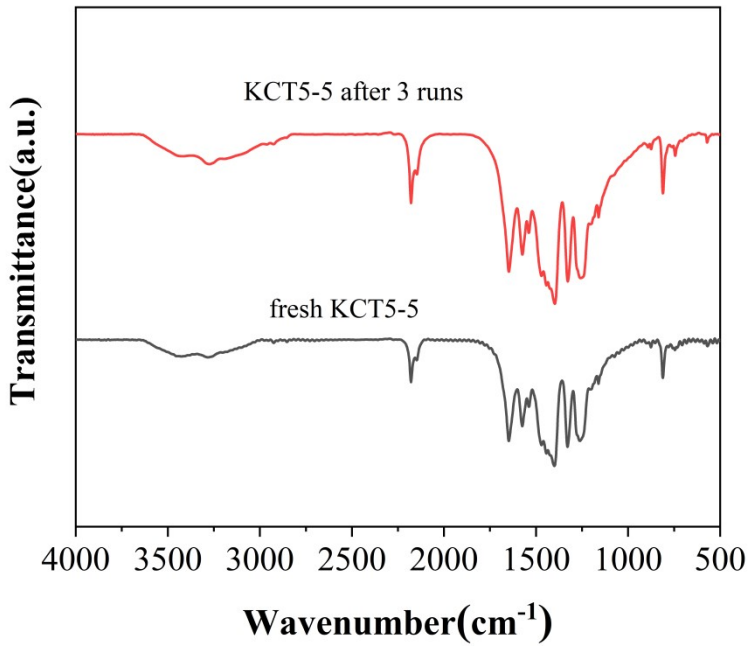

Figure S9. FTIR spectra of KCNT5-5 before and after cycle testing.

Table S2. Fitted decay time constants of CN, CNT5, KCN5 and KCT5-5 from TRPL spectra.

	τ_1/ns	A_1	τ_2/ns	A_2	τ_n/ns
CN	1.03	84708.58	6.44	0.71	1.03
CNT5	1.39	3919.54	8.39	0.83	1.40
KCN5	1.59	1438.28	7.46	1.18	1.61
KCT5-5	0.65	71.81	3.45	18.15	2.25

$\tau_n = (A_1\tau_1^2 + A_2\tau_2^2) / (A_1\tau_1 + A_2\tau_2)$

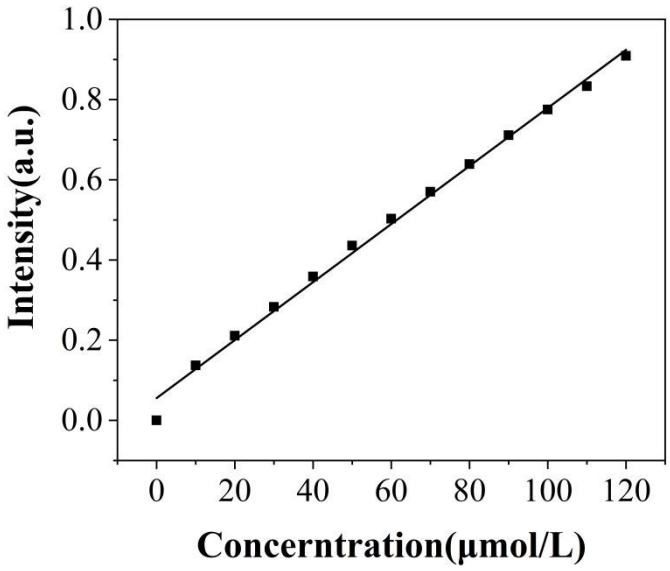

Figure S10. Measuring the concentrations of generated H_2O_2 by iodometry.

Table S3. Calculated K_f and K_d values of CN, CNT5, KCN5 and KCT5-5.

	K_f (10^1 μmol L^{-1} min^{-1})	K_d (10^{-3} min^{-1})
CN	0.13	8.33
CNT5	0.41	5.57
KCN5	3.35	4.34
KCT5-5	4.54	3.36

Table S4. Comparison of H_2O_2 production rates achieved by recently reported photocatalytic systems

Photocatalysts	Reaction solution	H_2O_2 yield (μmol g^{-1} h^{-1})	Ref.
MIL-125-NH_2	BNOH	800	[1]
Cu-doped g-C_3N_4	Water	1130	[2]
Ti_3C_2 QDs/g-C_3N_4	EA	560.7	[3]
Mn_3O_4/Co_9S_8	Water	270	[4]
S-doped-C/CdS	Water	712.5	[5]
Thiourea functionalized CTF	Water	653.62	[6]
KH_2PO_4/g-C_3N_4	10%EA	500	[7]
KPF6-C_3N_4	EA	300	[8]
ZnO nanorods	EA	285	[9]
K-doped g-C_3N_4/Ti_3C_2	10%IPA	1136.67	This work

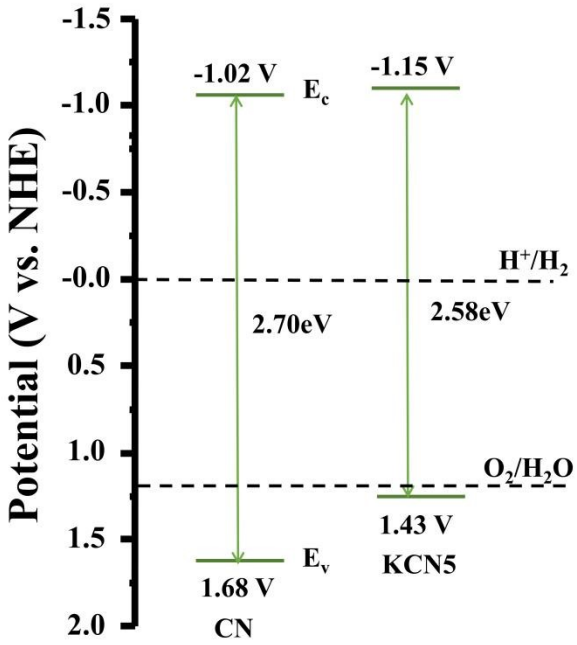

Figure S11. Schematic illustration of the band structure of CN and KCN5.

Reference

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