Electronic Supplementary Material (ESI) for Materials Advances.

Supporting Information

Application of single atom Ti doped g-C_3N_4 in photocatalytic H_2O_2 production

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Standard curve drawing:

The standard curve drawing and concentration determination of hydrogen peroxide will adopt the traditional iodometric method.

The specific approach is, firstly, using 30% hydrogen peroxide solution to prepare hydrogen peroxide solution with concentrations of 100 μM, 200 μM, 300 μM, 400 μM, 500 μM, and 600 μM, respectively. 1 mL of the above concentration gradient solution, 0.5 mL each of 0.4 M potassium iodide solution and 0.1 M potassium hydrogen phthalate solution were mixed, and wait for them to fully react for 20 minutes. Using UV visible spectroscopy to detect the absorption curve. The absorption values at 352 nm were draw standard curve corresponding to the concentration of each hydrogen peroxide solution. (Fig. S5)

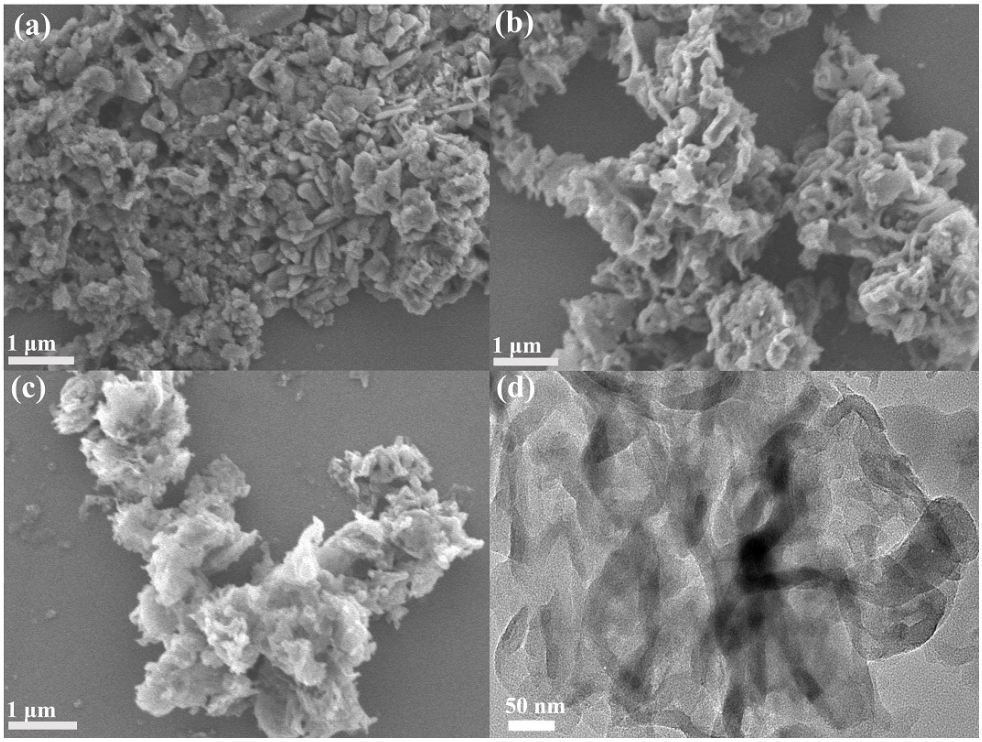

Fig. S1. SEM pictures of BCN (a); g-C_3N_4 (b) and Ti-C_3N_4-100 (c); TEM photograph of Ti-C_3N_4-100 (d).

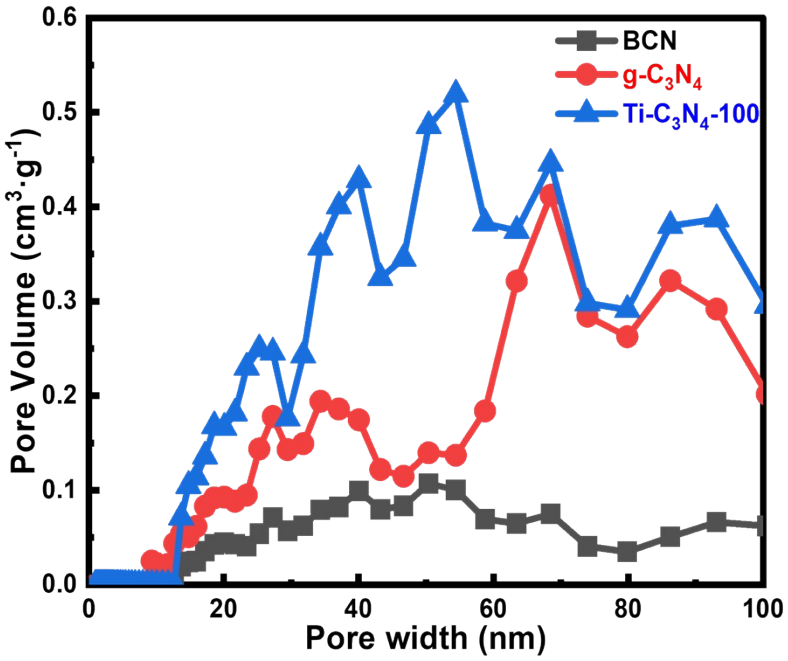

Fig. S2. Aperture distribution map of BCN, g-C_3N_4 and Ti-C_3N_4-100.

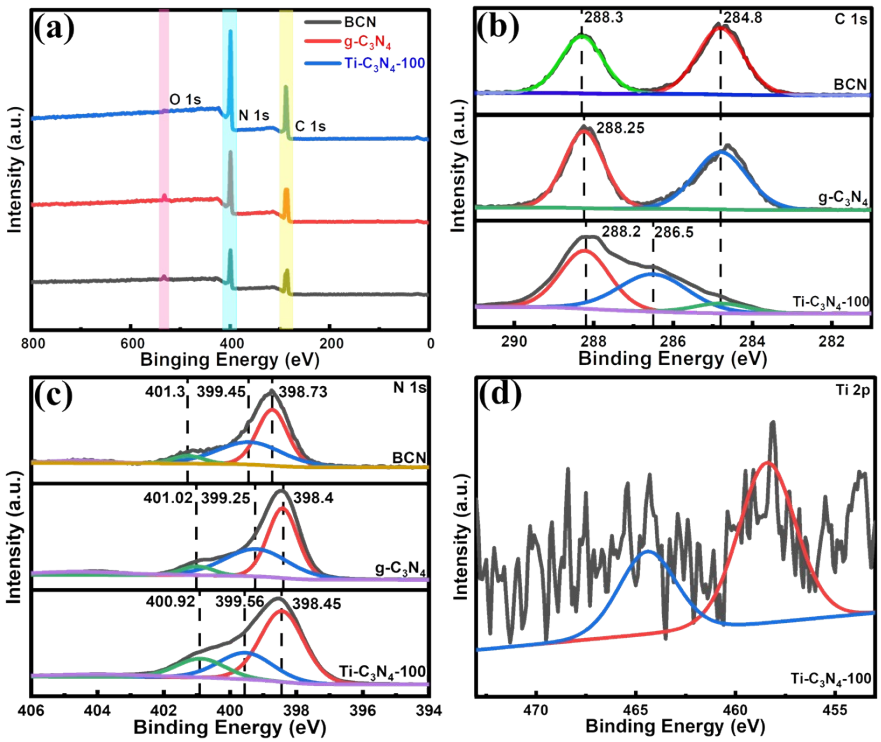

Fig. S3. The XPS spectra of the survey spectrum (a); C 1s (b), N 1s (c) of BCN, g-C_3N_4 and Ti-C_3N_4-100; Ti 2p of Ti-C_3N_4-100 (d).

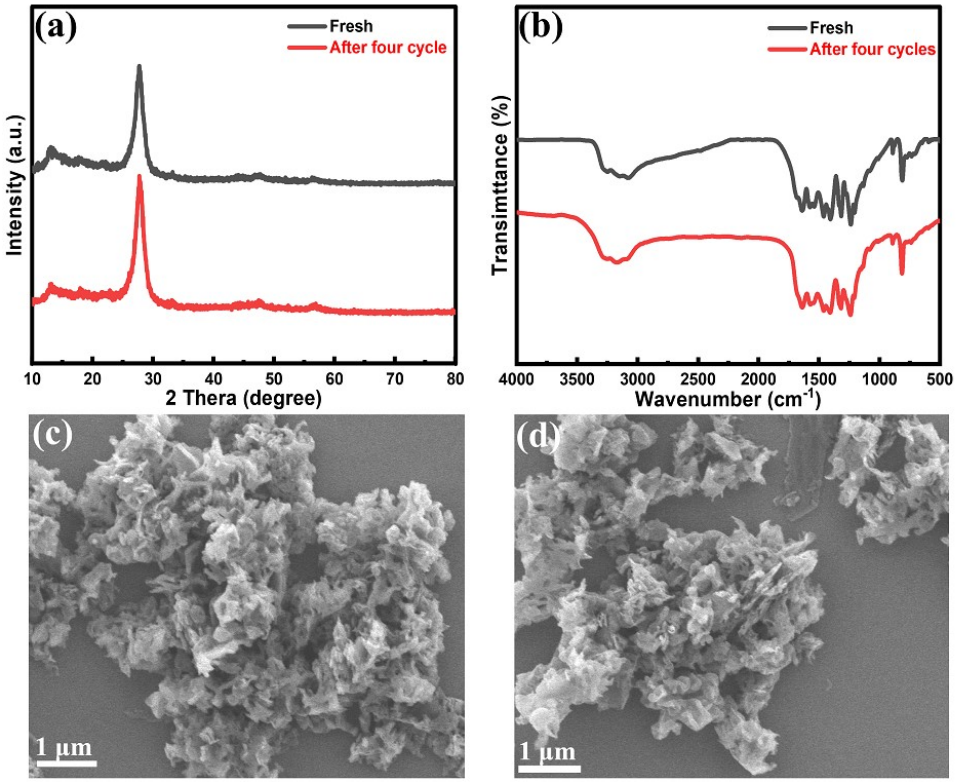

Fig. S4. XRD (a) and FTIR (b) spectra of Ti-C_3N_4-100; SEM image before 4 circulation (c) and SEM image after 4 circulations of Ti-C_3N_4-100 (d).

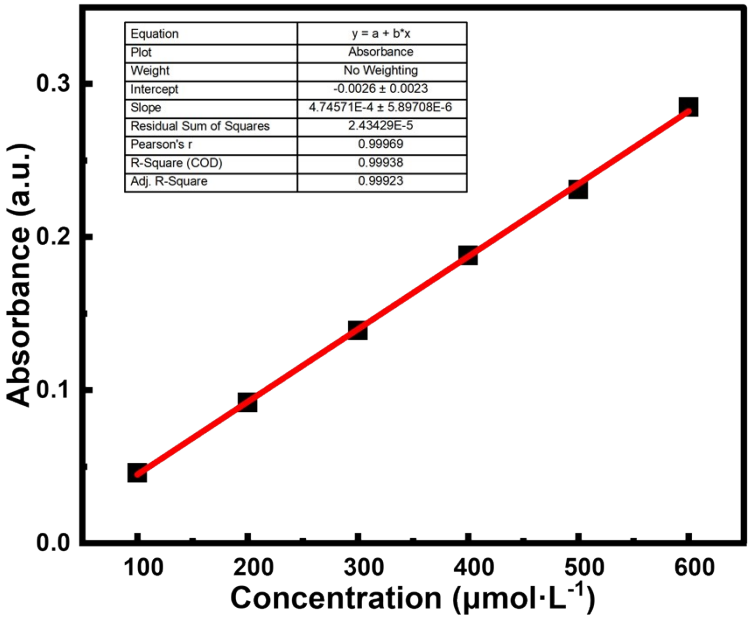

Fig. S5. Standard curves plotted with different concentrations of hydrogen peroxide solutions.

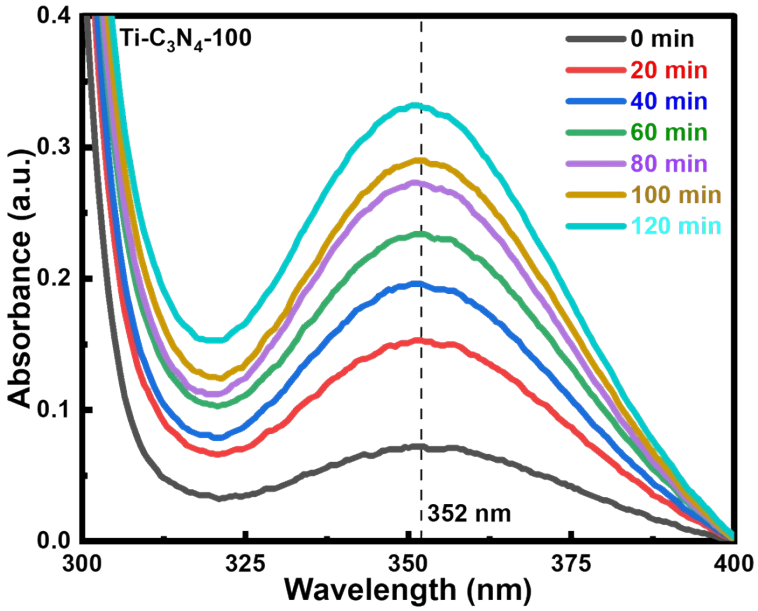

Fig. S6. Ti-C_3N_4-100 Under visible light irradiation(λ > Changes in UV vis absorption spectra of H_2O_2 produced at 420 nm) over time.

Table. S1. The mass fraction of Ti contained in Ti-SAC/g-C_3N_4

Samples	Ti (wt%)
Ti-C_3N_4-50	0.07
Ti-C_3N_4-100	0.09
Ti-C_3N_4-250	0.12

Table. S2. The information of three samples of Specific surface area, pore size, and pore volume.

Samples	$S_{(BET)}$ ($m^2 \cdot g^{-1}$)	Pore Size (nm)	Pore volume ($cm^3 \cdot g^{-1}$)
BCN	4.73	12.09	0.11
g-C_3N_4	24.98	23.01	0.17
Ti-C_3N_4-100	32.98	41.62	0.35

Table. S3. The calculated fit of the decay time τ for BCN, g-C_3N_4 and Ti-C_3N_4-100.

Sample	τ_1	Rel%	τ_2	Rel%	τ_3	Rel%	$\tau_{average}$
BCN	2.08 ns	33.21	6.21 ns	34.34	29.78 ns	36.46	8.48 ns
g-C_3N_4	1.82 ns	51.32	6.28 ns	45.65	31.19 ns	47.34	9.73 ns
Ti-C_3N_4-100	0.98 ns	15.46	3.77 ns	20.01	20.17 ns	16.21	5.41 ns