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Supplementary Information

Physical vapor deposition (PVD): a method to fabricate modified g-C_3N_4 sheets

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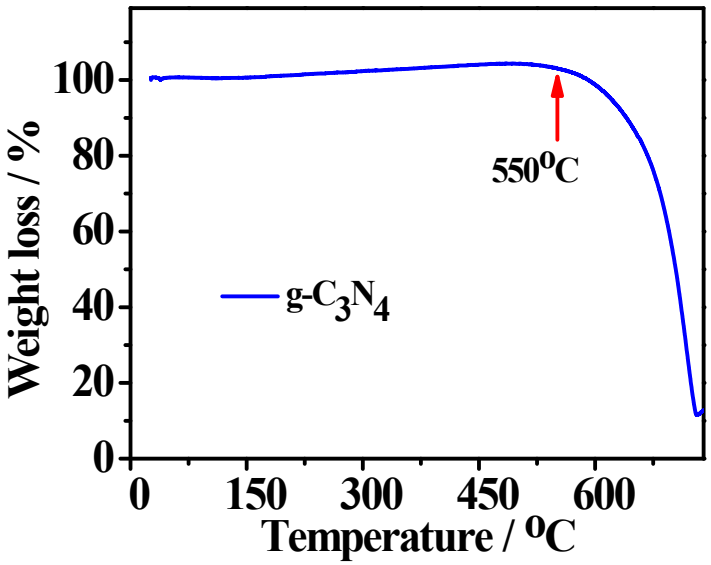

Fig. S1 Thermal gravimetric analysis (TGA) of g-C_3N_4

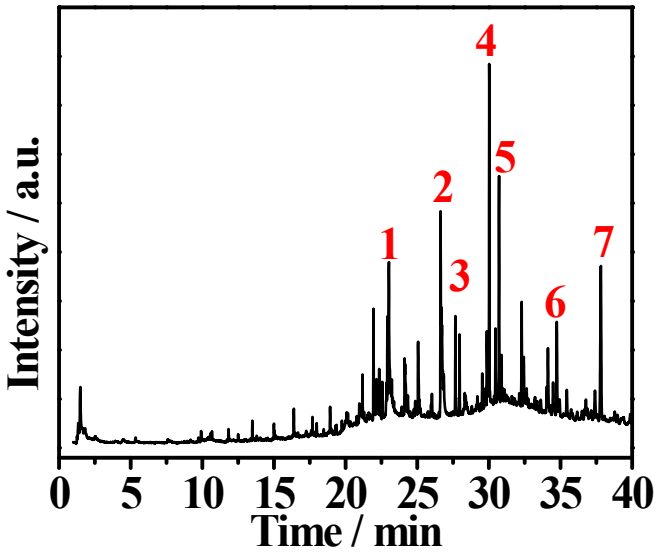

Fig. S2 Py-GC/MS of bulk g-C_3N_4 at 550 °C.

Table S1 The area ratio of gaseous derivatives and corresponding Mr from Fig. S2.

Peak	1	2	3	4	5	6	7
Area%	4.90	6.68	4.02	7.72	6.65	4.21	9.95
Mr	256	264	281	341	370	572	662

Only the Area% of derivatives molecules which exceeds 4% was listed.

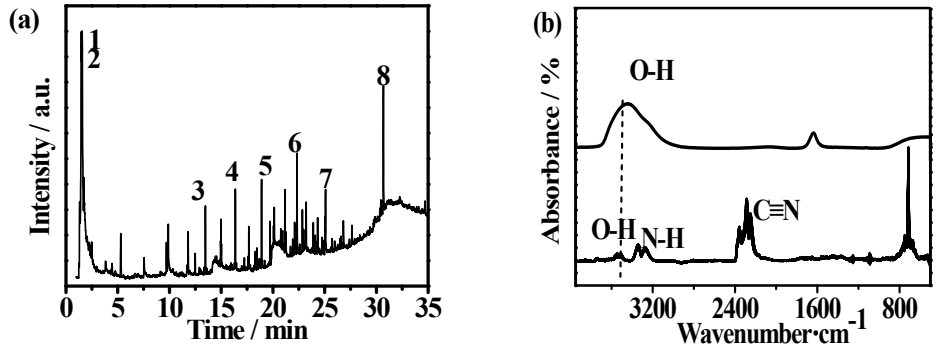

Fig. S3 Total ion chromatogram of Py-GC/MS of bulk g-C_3N_4 at 700 °C (a) and FTIR of liquid water (top) and gaseous derivatives (bottom) derived from bulk g-C_3N_4 at 700 °C (b)

Table S2 Area ratios and possible relative molecular mass (Mr) of gaseous derivatives derived from g-C_3N_4 corresponding total ion chromatogram in Fig. S2a

	1	2	3	4	5	6	7	8
Area% (**>2%**)	20.5	23.1	2.2	2.5	2.6	3.8	2.0	4.3
Mr	68	66	156	196	223	222	243	368

The pyrolysis gas was firstly investigated by pyrolyzer coupled with gas chromatography and mass spectrometry (Py-GC/MS). The m/z obtained by Py-GC/MS ranges from 45 to 750（full scan）which also indicates the MS section can not measure more large m/z than 750. The obvious peaks from C≡N stretching vibration appear at about 2260 nm^{-1} by TG-IR, while there not exists tri-s-triazine-based structure in the spectrum. It can be considered that the low temperature (180 °C) of pipeline between TG and IR result into the deposition of the pyrolysis gas on its wall.

Table S3 Binding energies and corresponding areas of XPS N1s of samples

	$g\text{-}C_3N_4$		CNS	
	binding energy	area	binding energy	area
N-H	401.1	17339	401.1	9185
N–(C)3	399.9	54576	400.2	19063
C–N=C	398.6	193086	398.8	95221

Table S4 Relative ratios of N–H, N–(C)3 and C–N=C of $g\text{-}C_3N_4$ and CNS by N1s spectral analysis

sample	N-H/C-N=C	N-(C)3/C-N=C
$g\text{-}C_3N_4$	0.043	0.28
CNS	0.096	0.20

Table S5 Surface and bulk atomic ratio (C/Nr, C/N) of the samples by XPS spectral analysis and elemental analysis

sample	C/Nr atm%	C/N atm%
$g\text{-}C_3N_4$	0.686	0.670
CNS	0.694	0.679

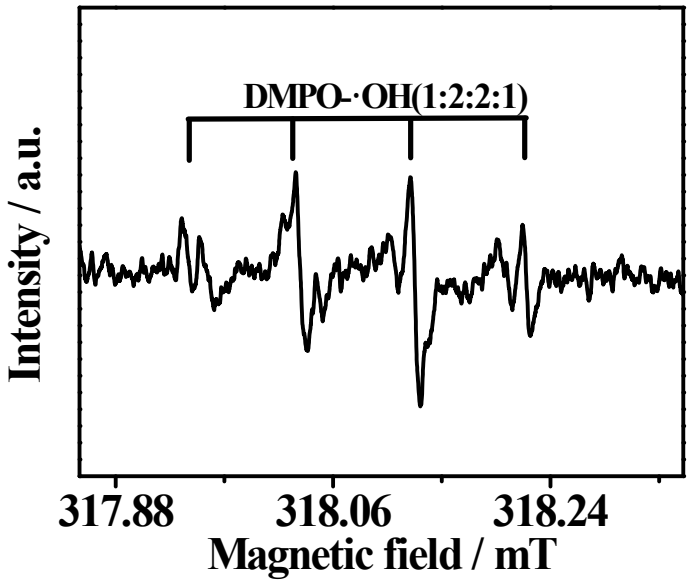

Fig. S4 ESR spectra of DMPO-spin adduct measured in the aqueous solution of CNS exposed to visible light (λ> 400 nm). Note that aqueous solution of CNS was purged with Ar to remove the dissolved O_2

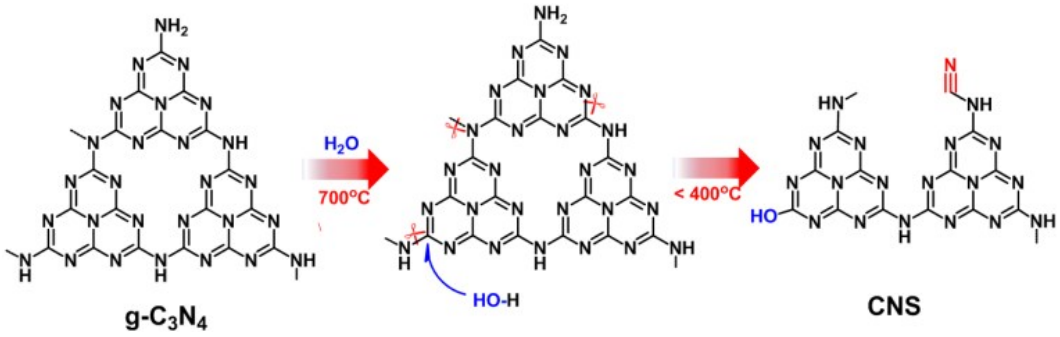

Fig. S5 Mechanism diagram of pristine g-C_3N_4 modified by PVD.