

Supplementary information

Fabrication of direct Z-scheme CoNiWO₄/Ph-gC₃N₄ heterocomposite: Enhanced photodegradation of bisphenol A and anticancer activity

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2.2. Synthesis of Ph-gC₃N₄

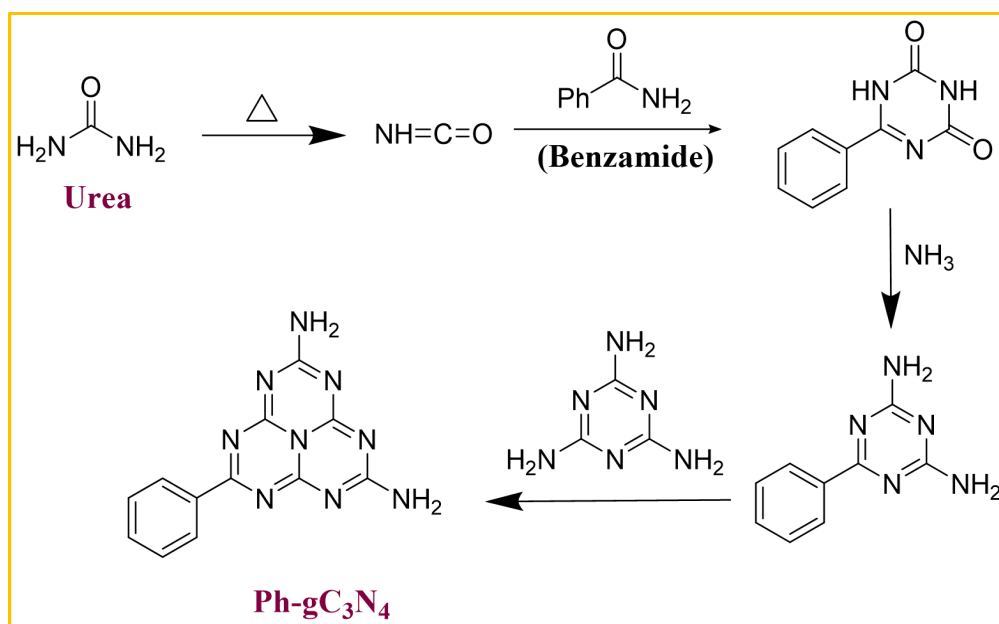


Fig. S1 Schematic representation of the synthesis of visible light active Ph-gC₃N₄ photocatalyst.

2.4. Synthesis of CoNiWO₄/Ph-gC₃N₄ heterocomposites

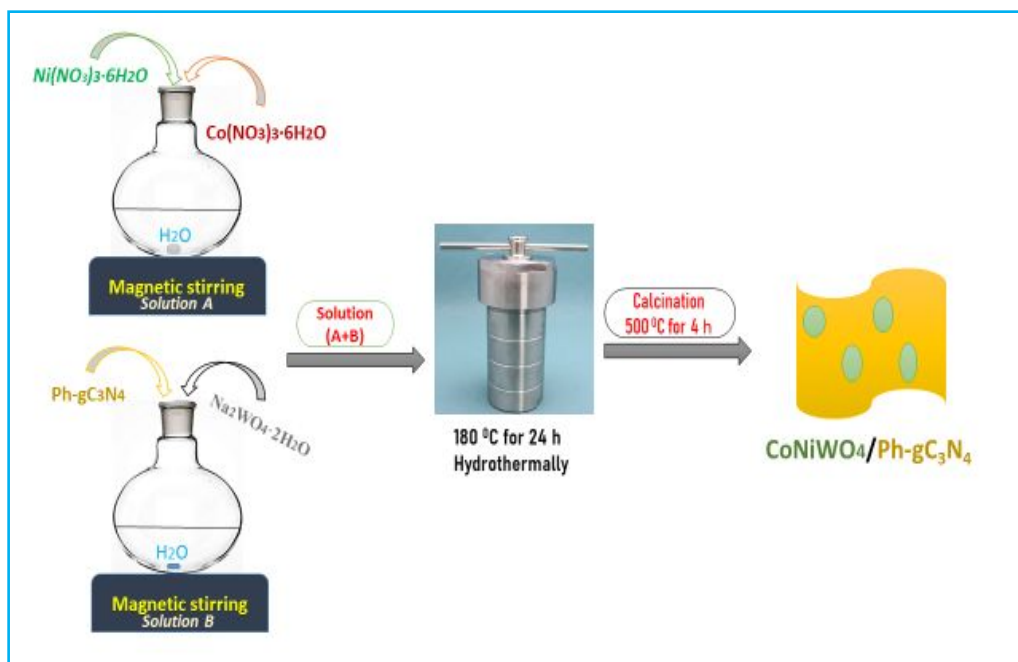


Fig. S2 Schematic representation of the synthesis of $\text{CoNiWO}_4/\text{Ph-gC}_3\text{N}_4$ heterocomposite.

3.4 XPS analysis (Table S1)

Name of the element	Binding Energy (eV)	Area (cps. eV)	Atomic %
N1s	397.44	1704367.59	53.29
C1s	286.52	852082.86	42.17
O1s	530.38	210109.64	4.13

3.5 BET analysis (Table S2)

Synthesized Photocatalyst	BET-specific surface area (m^2g^{-1})	Pore size (nm)	Pore volume (cm^3g^{-1})

CoNiWO ₄	40.1	11.58	0.11
Ph-C ₃ N ₄	275.17	9.05	0.41
20CoNiWO ₄ /Ph-gC ₃ N ₄	348.35	11.62	1.46

4.0 Comparison of photocatalytic activity of 20CoNiWO₄/Ph-gC₃N₄ with previously reported photocatalysts (Table S3).

Photocatalyst	Pollutants	Removal efficiency (%)	Irradiation time (min)	References
CoWO ₄	MO	>90	90	[32]
WO ₃ /NiWO ₄	RhB	100	120	[4]
Cu-NiWO ₄ /g-C ₃ N ₄	n-Hexane	96	120	[11]
g-C ₃ N ₄ /NiWO ₄	Toluene	95	120	[23]
CoWO ₄ /g-C ₃ N ₄	Norfloxacin	97	80	[26]
CoNiWO ₄ /Ph-gC ₃ N ₄	Methyl Orange	97.40	75	Current work
20CoNiWO ₄ /Ph-gC ₃ N ₄	Bisphenol A	84	125	„

4.2 Anticancer Activity (Table S4)

Sample code	IC50 value
CNT	428.3 μM

PCN	318.3 μM
PCNT	225.1 μM

4.2 A549 cell morphological analysis

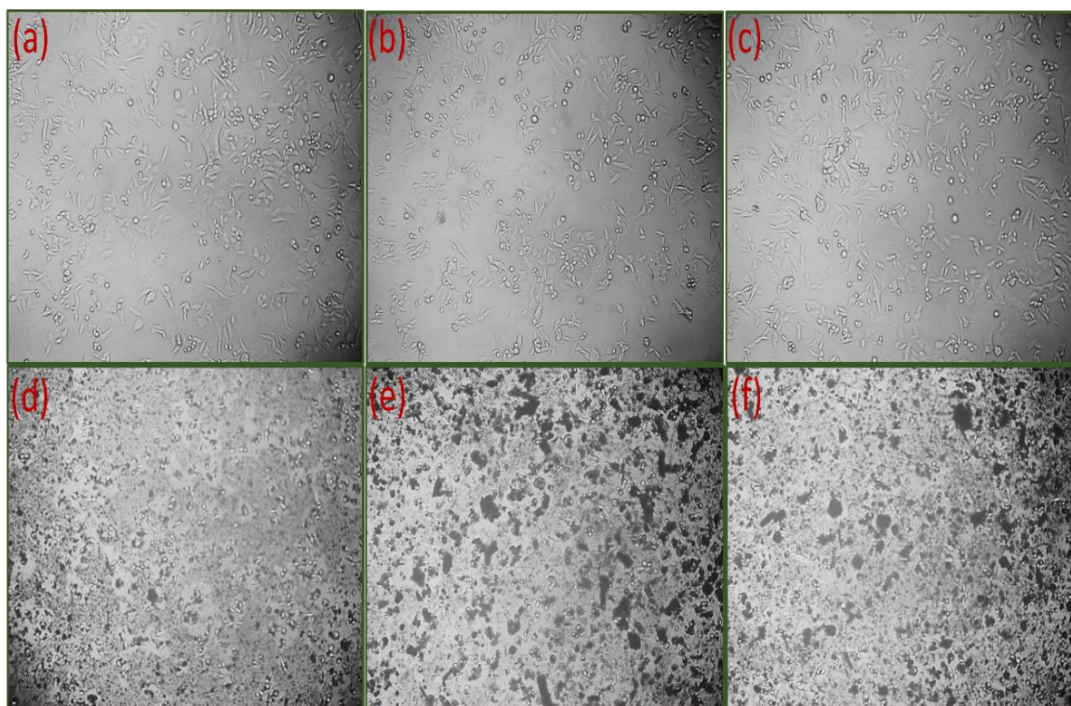


Fig. S3 Morphological analysis of A549 lung cancer cells over as-synthesized pure CoNiWO_4 , (a) before, (d) after treatment, pure $\text{Ph-gC}_3\text{N}_4$ (b) before, (e) after treatment and $20\text{CoNiWO}_4/\text{Ph-gC}_3\text{N}_4$ (c) before, (f) after treatment.

4.7 Photocatalytic degradation mechanism

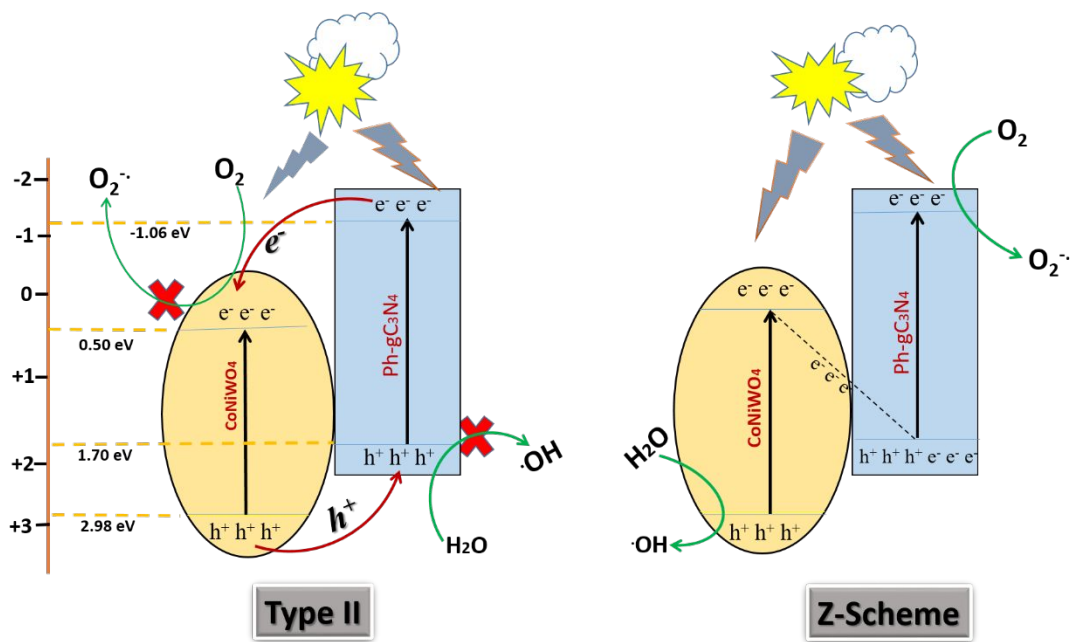


Fig. S4 Schematic diagram of the charge-separation and possible comparative photocatalytic degradation mechanism for Type-II & Z-scheme on irradiated CoNiWO₄/Ph-gC₃N₄ heterocomposite under visible light.