

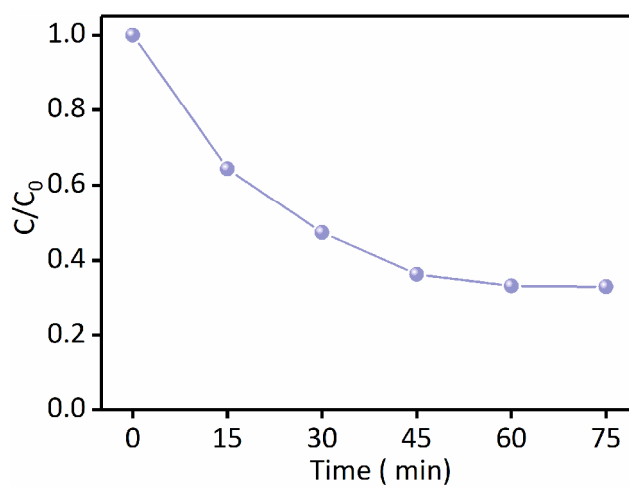
## Simultaneous Photocatalytic Oxygen Production and Hexavalent Chromium Reduction in $\text{Ag}_3\text{PO}_4/\text{C}_3\text{N}_4$ S-scheme Heterojunction

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**Figure S1.** The performance of APCN5 sample in the separated Cr (VI) reduction reaction.

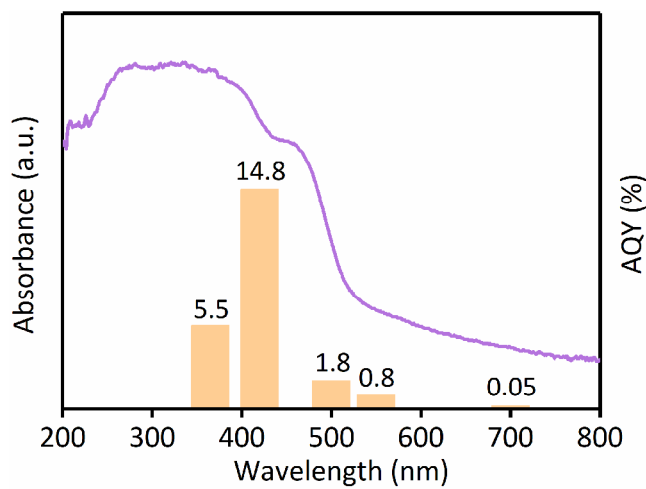
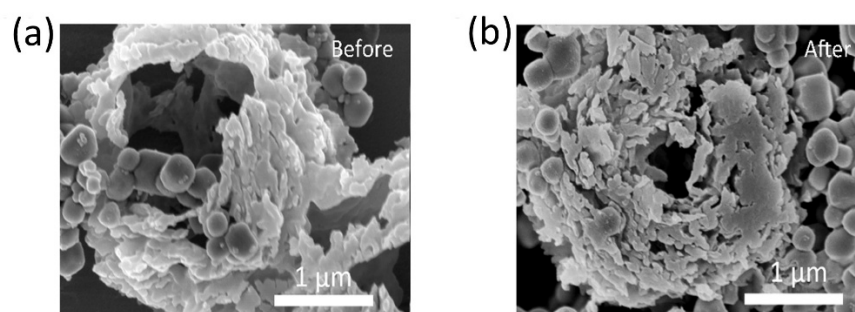


Figure S2. AQY APCN5 at different wavelengths.



**Figure S3.** SEM images of the APCN5 composite before (a) and after (b) photocatalytic reaction.

**Table S1.** Comparison of the Photocatalytic O<sub>2</sub> Generation Activity

Photocatalysts	Light source	Sacrificial donor	O <sub>2</sub> production, $\mu\text{mol}\cdot\text{g}^{-1}\cdot\text{h}^{-1}$	Ref.
APCN5	$\lambda \geq 420$ nm	0.06 M AgNO <sub>3</sub>	1051.3	This work
MoS <sub>2</sub> /Ag <sub>3</sub> PO <sub>4</sub>	$\lambda \geq 320$ nm	0.01 M AgNO <sub>3</sub>	260.71	[1]
NiAl-LDH/g-C <sub>3</sub> N <sub>4</sub> /Ag <sub>3</sub> PO <sub>4</sub>	AM 1.5 G	0.05 M AgNO <sub>3</sub>	268	[2]
g-C <sub>3</sub> N <sub>4</sub> /Ag <sub>3</sub> PO <sub>4</sub>	$\lambda > 420$ nm	0.01 M AgNO <sub>3</sub>	115	[3]
MXene/ Ag <sub>3</sub> PO <sub>4</sub>	AM 1.5 G		35.8	[4]
MoS <sub>2</sub> /Ag dots/Ag <sub>3</sub> PO <sub>4</sub>	$\lambda > 400$ nm	0.01 M AgNO <sub>3</sub>	404	[5]
MoSe <sub>2</sub> /Ag <sub>3</sub> PO <sub>4</sub>	$\lambda > 420$ nm	0.01 M AgNO <sub>3</sub>	182	[6]

**Table S2.** Comparison of the Photocatalytic Cr (VI) Degradation

Photocatalysts	Light source	The concentration of Cr (VI)	The reaction time	Cr (VI) reduction amount	Ref.
APCN5	$\lambda \geq 420$ nm	20 mg/L	75 min	17.58 mg	This work
BiOI	AM 1.5 G	10 mg/L	10 min	10 mg	7
Ag <sub>3</sub> PO <sub>4</sub> /WO <sub>3</sub>	$\lambda \geq 420$ nm	20 mg/L	30 min	14.4 mg	8
g-C <sub>3</sub> N <sub>4</sub> /Bi <sub>3</sub> NbO <sub>7</sub>	$\lambda \geq 400$ nm	10 mg/L	60 min	9.27 mg	9
CuBiOS@CuBi <sub>2</sub> O <sub>4</sub>	$\lambda \geq 420$ nm	10 mg/L	15 min	9.54 mg	10
MoS <sub>2</sub> -FeS <sub>2</sub>	$\lambda \geq 400$ nm	10 mg/L	33 min	8 mg	11

**Table S3.** Specific Surface Area of C<sub>3</sub>N<sub>4</sub> with Different Morphologies

Sample	C <sub>3</sub> N <sub>4</sub> hollow sphere	C <sub>3</sub> N <sub>4</sub> tube	C <sub>3</sub> N <sub>4</sub> bulk	C <sub>3</sub> N <sub>4</sub> sheets
specific surface area	1617 m <sup>2</sup> /kg	493.8 m <sup>2</sup> /kg	479.3 m <sup>2</sup> /kg	507.3 m <sup>2</sup> /kg

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