Supporting information

Computational details

In this study, the Vienna ab initio Simulation Package (VASP) within the frame of density functional theory (DFT) was utilized for all calculations. The exchange-correlation interactions of electrons were described using the generalized gradient approximation (GGA) with PBE functional. The interactions of electron and ion were characterized using the projector augmented wave (PAW) method. The Monkhorst-Pack scheme with a 3 x 3 x 1 k-point mesh was employed for the integration in the irreducible Brillouin zone. A plane wave expansion with a cut-off energy of 500 eV was selected for the calculations. The lattice parameters and ionic position were fully relaxed, and the total energy was converged to within 10^{-4} eV per formula unit. The final forces on all ions were maintained below 0.01/Å.

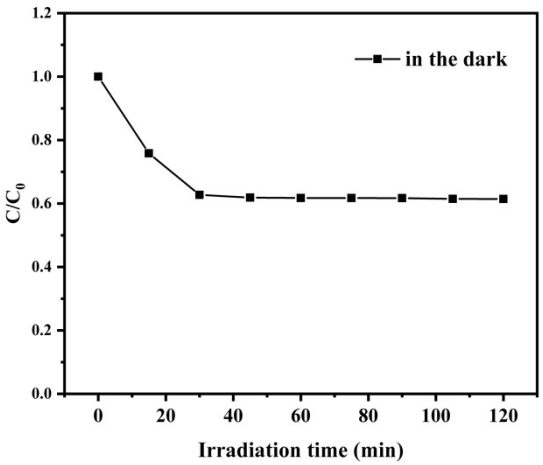

Fig. S1 The adsorption experiments of the AC-0.025 sample toward TCH for 120 min in dark.

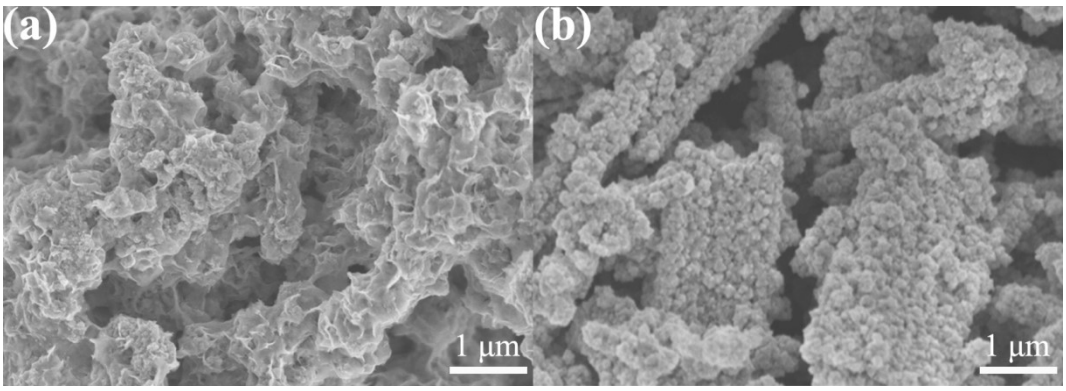

Fig. S2 SEM images of (a) AC-0.01, (b) AC-0.05.

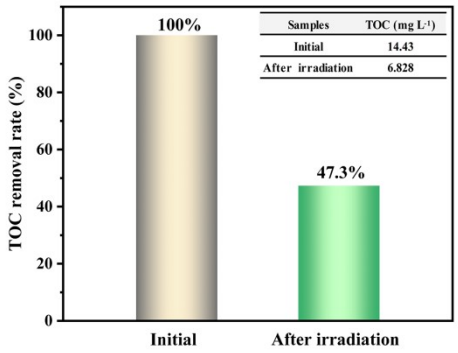

Fig. S3 TOC removal ratio of TCH by AC-0.025.

Table S1. Performance comparison of $AgVO_3/CaIn_2S_4$ with previously reported photodegradation of TCH by systems based on $AgVO_3$ and $CaIn_2S_4$.

Photocatalysts	Light source	Concentration (mg L^{-1}) of TCH	Catalyst amount/volume of TCH	Degradation (%), illumination time (min)	Ref.
$CaIn_2S_4$-$Ti_3C_2T_x$	halogen lamp (400 W, λ > 420 nm)	20	50 mg/50 mL	92, 150	S1
KBi_6O_9I/Ag-$AgVO_3$	halogen bulb (400 W)	25/50	200 mg/200 mL	88.3/83.5, 120	S2
$AgVO_3/Ag_4V_2O_7$/BiOI	halogen lamp (1000 W)	10	0.1 g/100 mL	100, 80	S3
$AgVO_3$/UiO-66	Xe lamp (300 W)	10	20 mg/100 mL	78.5, 60	S4
$AgVO_3/Ag_2S$	Xe lamp (300 W, λ > 400 nm)	20	10 mg/100 mL	70.45, 120	S5
$AgVO_3/BiVO_4$/graphene	Xe lamp (500 W, 420 nm filter)	50	--/50 mL	92, 80	S6
$AgVO_3/Bi_4Ti_3O_{12}$	Xe lamp (300 W, λ > 420 nm)	5	30 mg/100 mL	57, 60	S7
Ag-$AgVO_3$/g-C_3N_4	Xe lamp (300 W, 410 nm filter)	15/200	0.04 g/200 mL	83.6, 120	S8
$AgVO_3$/RGO/C_3N_4-PVDF	Xe lamp (300 W, λ > 400 nm)	10	5.4×5.9 cm^2/50 mL	88.53, 120	S9
$AgVO_3/CaIn_2S_4$	Xe lamp (500 W, λ > 420 nm)	20	1 g/L^{-1}	94.1, 80	This study

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