

**Excellent photocatalytic degradation and disinfection performance of a novel  
bifunctional Ag@AgSCN nanostructure with exposed {-112} facets**

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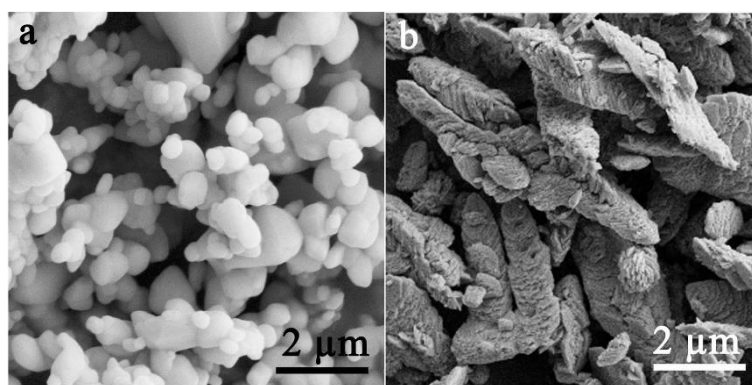


Fig.S1 SEM images of (a) Sample-1 and (b) leaf-shaped structure of Ag@AgSCN

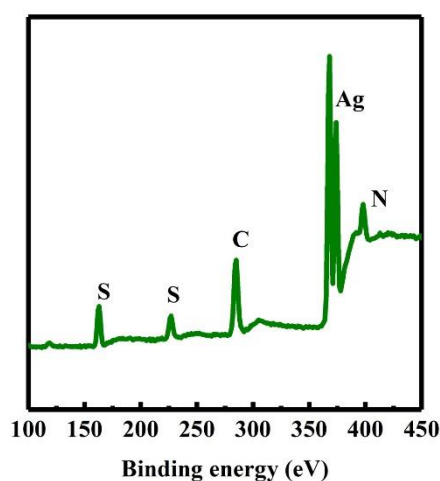


Fig.S2 full-range XPS spectrum of Ag@AgSCN

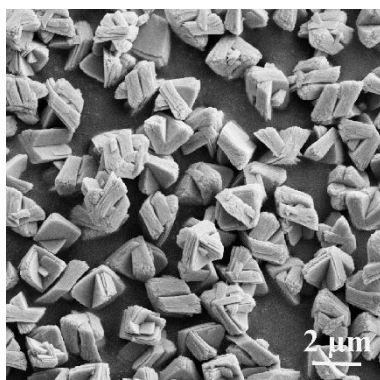


Fig.S3 SEM image of pure AgSCN.

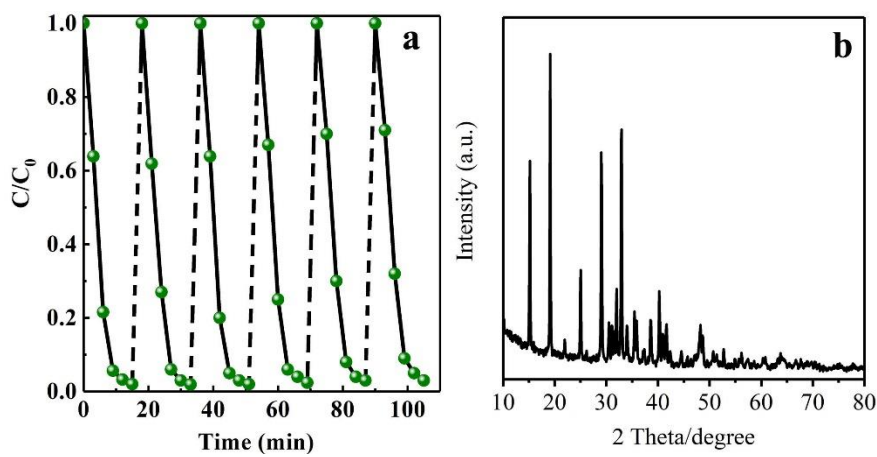


Fig.S4 (a) cycling degradation experiments of Sample-2 and (b) XRD patterns of Sample-2 after degradation

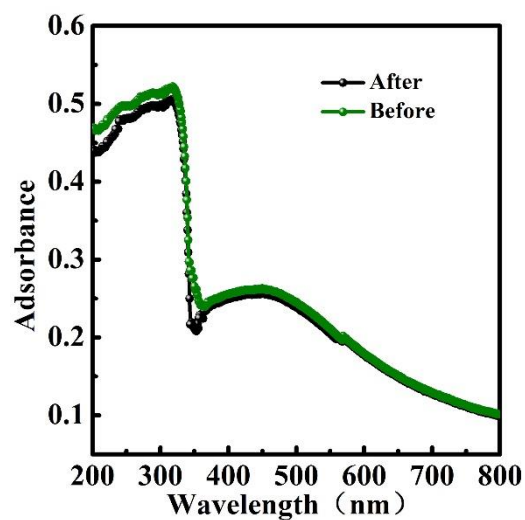


Fig.S5 Absorption spectra of Ag@AgSCN before and after six cycles

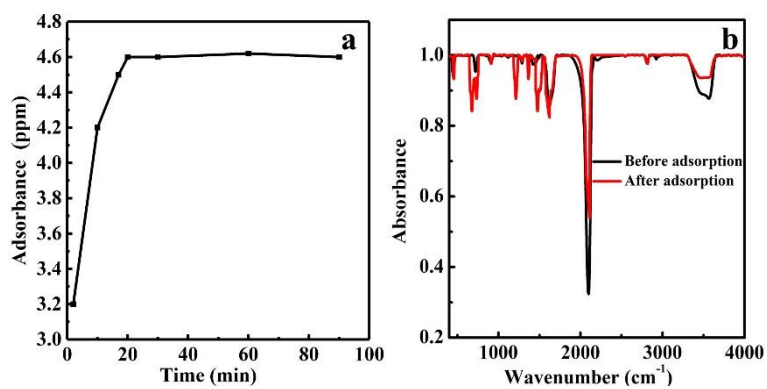


Fig.S6 (a) Adsorption plot of Ag@AgSCN adsorption on phenol, (b) FT-IR spectra of Ag@AgSCN before and after adsorption

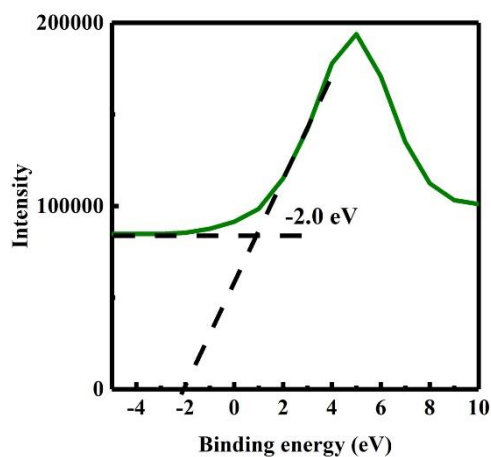


Fig.S7 XPS spectrum of AgSCN

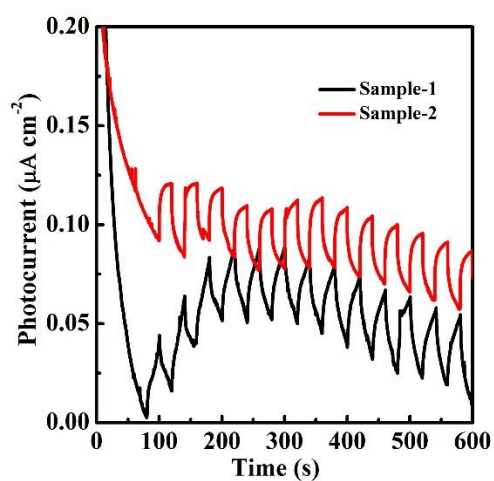


Fig. S8 Photocurrent plots of Sample-1 and Sample-2

Table S1 elements content of Sample-2 and Sample-3

Sample	Ag@AgSCN (mg)	S content (wt%)	$n_{\text{AgSCN}} \times 10^5$	$n_{\text{Ag}} \times 10^7$	$n_{\text{Ag}} : n_{\text{AgSCN}}$
Sample-2	2.130	18.717	1.245	5.730	0.0460
Sample-3	2.033	18.712	1.188	5.518	0.0464

Table S2 parameters of dynamic model ( $R^2$ ,  $k$ ,  $\alpha$  and  $\beta$  respect for coefficient of correlation, rate constant, Elovich initial adsorption rate and desorption constant, respectively.)

	Lagergren first-order kinetic model	Lagergren second-order kinetic model	Elovich equation	Internal diffusion model
$R^2$	0.93	0.99	0.84	0.51
$k$	4.10	0.09		0.19
$\alpha$			39.73	
$\beta$			1.70	

Table S3 the rate constants ( $k$ ) and regression coefficients ( $R^2$ ) of Sample-2 in an aqueous solution saturated with different atmosphere

<i>Atmosphere</i>	<i>k (min<sup>-1</sup>)</i>	<i>R<sup>2</sup></i>
<b>N<sub>2</sub></b>	0.24	0.98
<b>O<sub>2</sub></b>	0.43	0.95