Electronic Supplementary Information (ESI) for

Nano-sized aggregate Ti_3C_2–TiO_2 supported on the surface of Ag_2NCN as a Z-scheme catalyst with enhanced visible light photocatalytic performance

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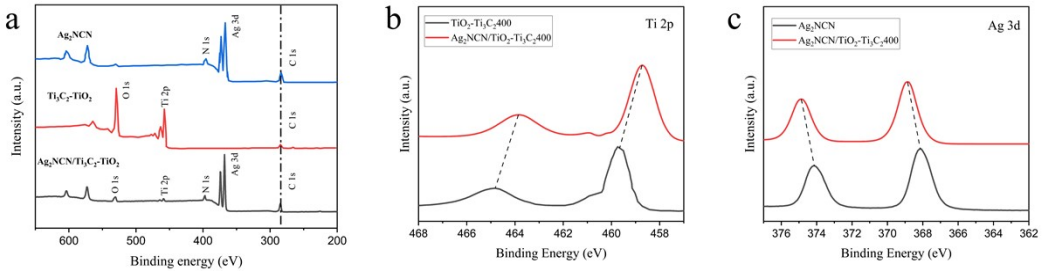

Figure S1 (a) Survey XPS spectrum of as-prepared catalysts. (b, c) XPS spectrum of the Ti 2p and Ag 3d for as-prepared catalysts.

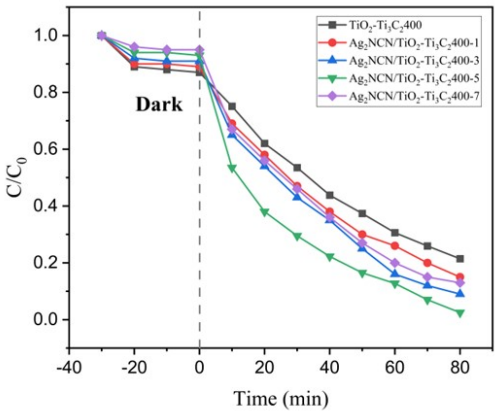

Figure S2 The photocatalytic activities of composites with different content of Ag_2NCN for Rh B degradation under visible light illumination ($\lambda > 420$ nm).

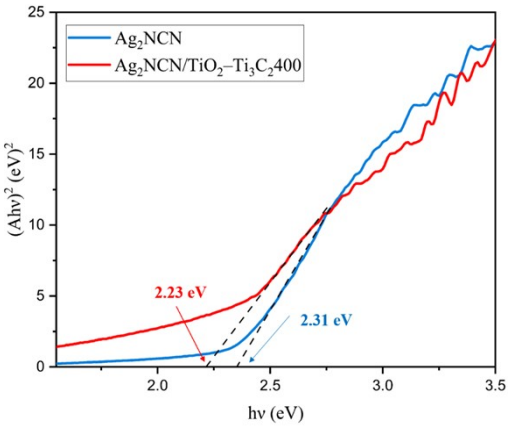

Figure S3 The band gap energies of Ag_2NCN and Ag_2NCN/TiO_2-Ti_3C_2400.

Title	Peak position ev	Peak area（P） CPS.eV	Atomic %
C 1s	284.57	342325.74	47.69
Ag 3d	367.98	2666938.77	17.74
N 1s	397.35	182070.49	16.32
O 1s	531.05	250710.81	13.02
Ti 2p	458.9	148901.43	5.23

Table S1 The main elements percentage ratio for the Ag_2NCN/TiO_2-$Ti_3C_2$400 composite detected by XPS.

Synthesis of Ag_2NCN/TiO_2–Ti_3C_2 nanocomposites

Ag_2NCN/TiO_2–$Ti_3C_2$400 with different content of Ag_2NCN was prepared through a simple physical weak interaction deposition process. $AgNO_3$ was first dissolved in 20 mL of deionized water. Following that, $NH_3 \cdot H_2O$ (1.5 M) aqueous solution was swiftly added and fixed volume to 200mL with deionized water to make a clear solution under magnetic stirring, and afterwards, 0.1 g of TiO_2–Ti_3C_2 was added. After 20 minutes of ultrasonic processing, H_2NCN (5.0 mmol) was added dropwise while being stirred for 30 minutes. The precipitate that resulted was then dried in an oven at 60 °C to produce the products. The amount of reagent added was shown in the Table S2.

Sample	Ag_2NCN (mmol)	$NH_3 \cdot H_2O$ (1.5M) (mL)	TiO_2–Ti_3C_2 (g)	H_2NCN (mL)
TiO_2-$Ti_3C_2$400	0	0	0.1	0
Ag_2NCN/TiO_2 -$Ti_3C_2$400-1	1.0	25.0	0.1	1.0
Ag_2NCN/TiO_2 -$Ti_3C_2$400-3	3.0	75.0	0.1	3.0
Ag_2NCN/TiO_2 -$Ti_3C_2$400-5	5.0	125.0	0.1	5.0
Ag_2NCN/TiO_2 -$Ti_3C_2$400-7	7.0	175.0	0.1	7.0

Table S2 The amount of reagent added for preparing Ag_2NCN/TiO_2–$Ti_3C_2$400 with different content of Ag_2NCN.