Supplementary information

Pt decorated hierarchical Sb_2WO_6 microsphere as a surface functionalized photocatalyst for the visible-light-driven reduction of nitrobenzene to aniline

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Table S1 XPS fitting results for the prepared SWO-NS and Pt/SWO-NS.

Samples	Peak	Assignment	BE (eV)	Fraction (%)
SWO-NS	W $4f_{5/2}$/ $4f_{7/2}$	W^{6+}	37.70/ 35.50	57.61
		W^{5+}	36.40/ 34.40	42.39
Pt/SWO-NS		W^{6+}	37.70/ 35.50	63.51
		W^{5+}	36.60/ 34.60	36.49
Pt/SWO-NS	Pt $4f_{5/2}$/ $4f_{7/2}$	Pt^{0}	71.10/74.45	5.46
		Pt^{2+}	72.20/75.55	94.54

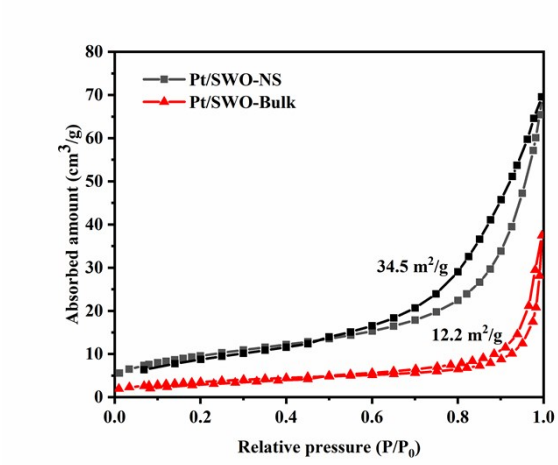

Fig. S1 Nitrogen (N_2) adsorption-desorption isotherms of SWO-NS and SWO-Bulk.

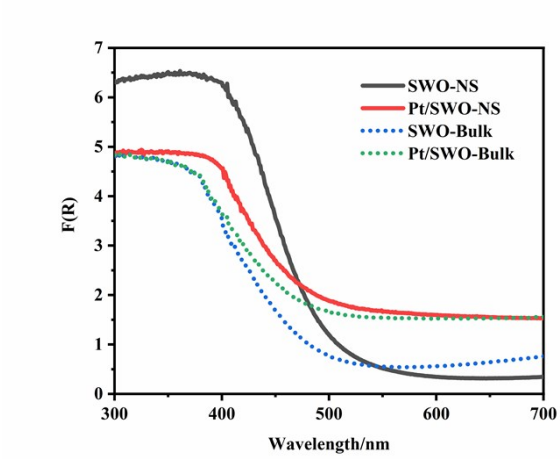

Fig. S2 UV-vis DRS of SWO-NS, Pt/SWO-NS, SWO-Bulk, Pt/SWO-Bulk.

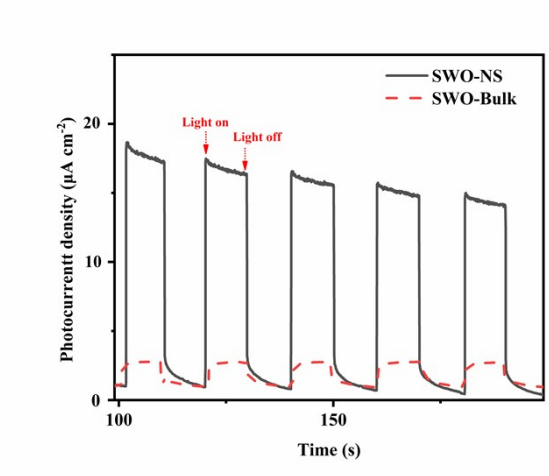

Fig. S3 Photocurrent responses of SWO-NS and SWO-Bulk under visible light irradiation.

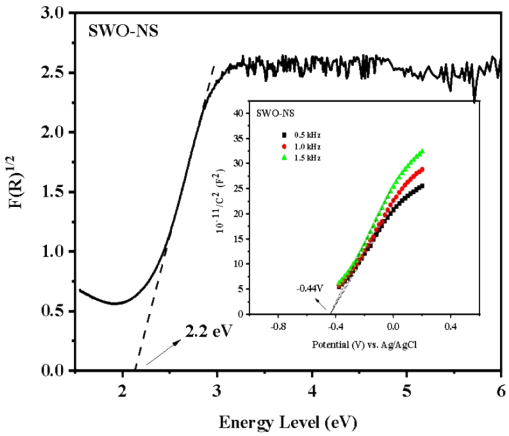

Fig. S4 $(Fh\nu)^{0.5}$ as a function of photonenergy (hν), where F is the Kubelka-Munk fuction. and the inset is the Mott-Schottky plots of SWO-NS.

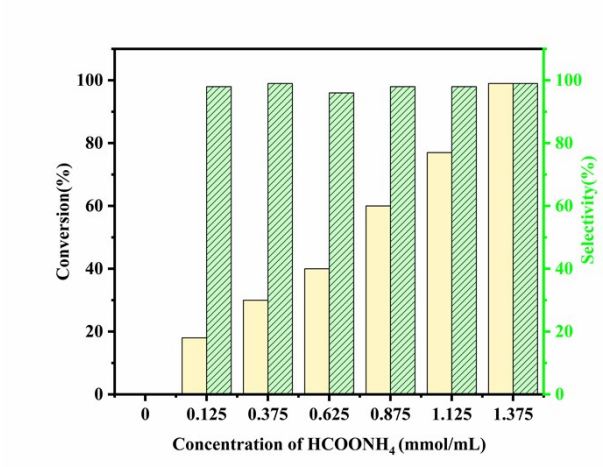

Fig. S5 Conversion of nitrobenzene and selectivity of aniline with different concentration of

$HCOONH_4$. Reaction condition: Catalyst 10 mg, $HCOONH_4$/methanol solution 1.5 mL, nitrobenzene 0.1 mmol, Ar, 1 atm, λ≥420, time 2 h, room temperature.

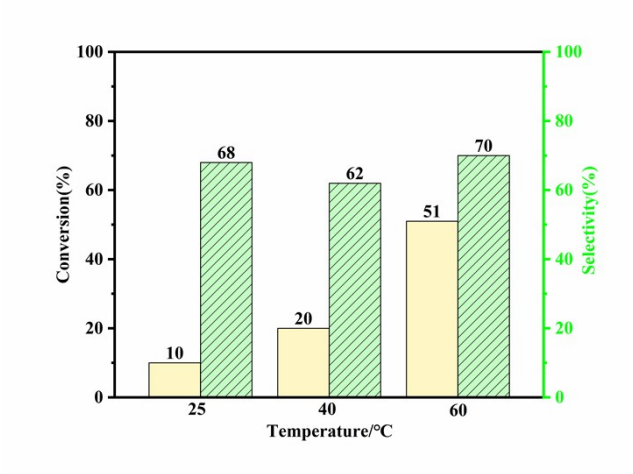

Fig. S6 Conversion of nitrobenzene and selectivity of aniline with different reaction temperature in the dark. Reaction condition: Catalyst 10 mg, 1.375 mmol/mL $HCOONH_4$/methanol solution 1.5 mL, nitrobenzene 0.1 mmol, Ar, 1 atm, time 2 h, room temperature.

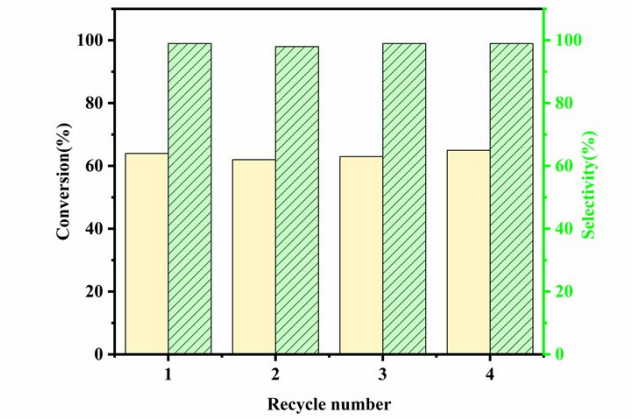

Fig. S7 Recycle experiment in constant temperature. Reaction condition: Catalyst 10 mg, 1.375 mmol/mL $HCOONH_4$/methanol solution 1.5 mL, nitrobenzene 0.1 mmol, Ar, 1 atm, λ≥420, time 2 h, 298K. Reaction temperature was controlled via a jacket connected to a circulating water source to avoid the thermal effect under the light irradiation.

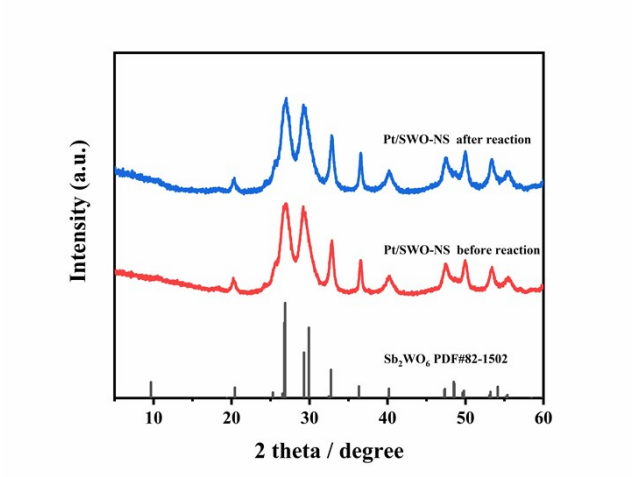

Fig. S8 XRD patterns of the Pt/SWO-NS sample (before and after reaction).

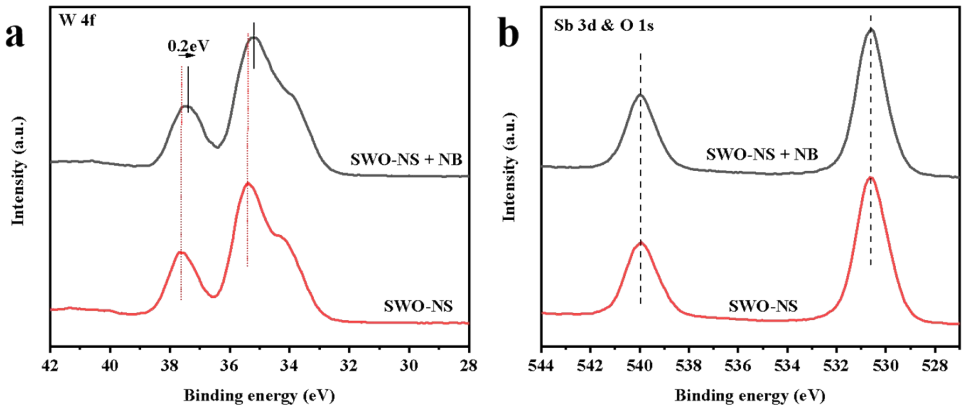

Fig. S9 XPS spectrum of SWO-NS and SWO-NS + NB. (a) W 4f; (b) Sb 3d & O 1s.

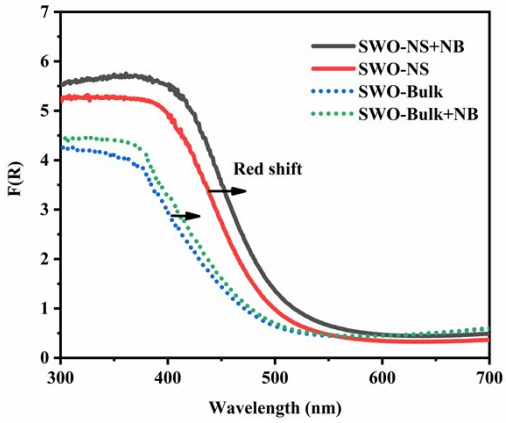

Fig. S10 UV-vis diffuse reflectance spectra of SWO-NS, SWO-Bulk，SWO-NS/NB and SWO-Bulk/NB.

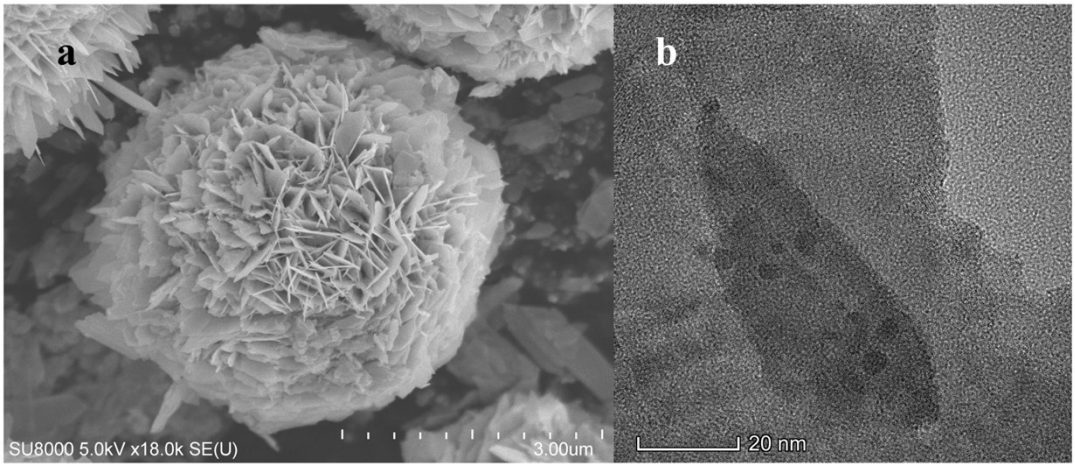

Fig. S11 SEM (a) and TEM (b) images of Pt/SWO-NS after the catalysis.

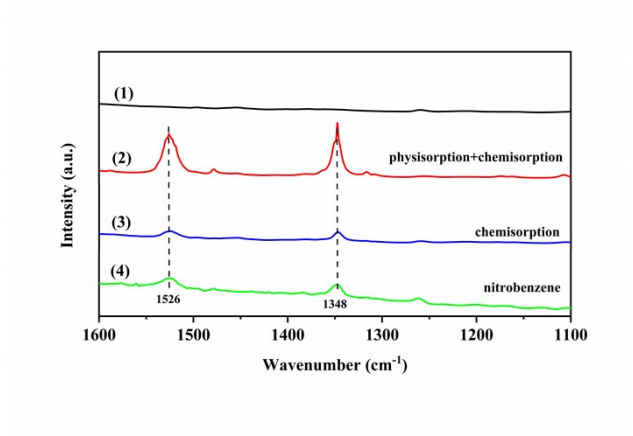

Fig. S12 In-situ FTIR spectra of Pt/SWO-NS adsorbed NB molecules. 1) After degassing in vacuum at 180 ℃ for 3 h; 2) adsorption of nitrobenzene for 0.5 h at room temperature (physisorption +chemisorption); 3) further degassing in vacuum at 180 ℃ for 5 min (chemisorption); 4) adsorption of nitrobenzene on KBr.