Supplementary Materials

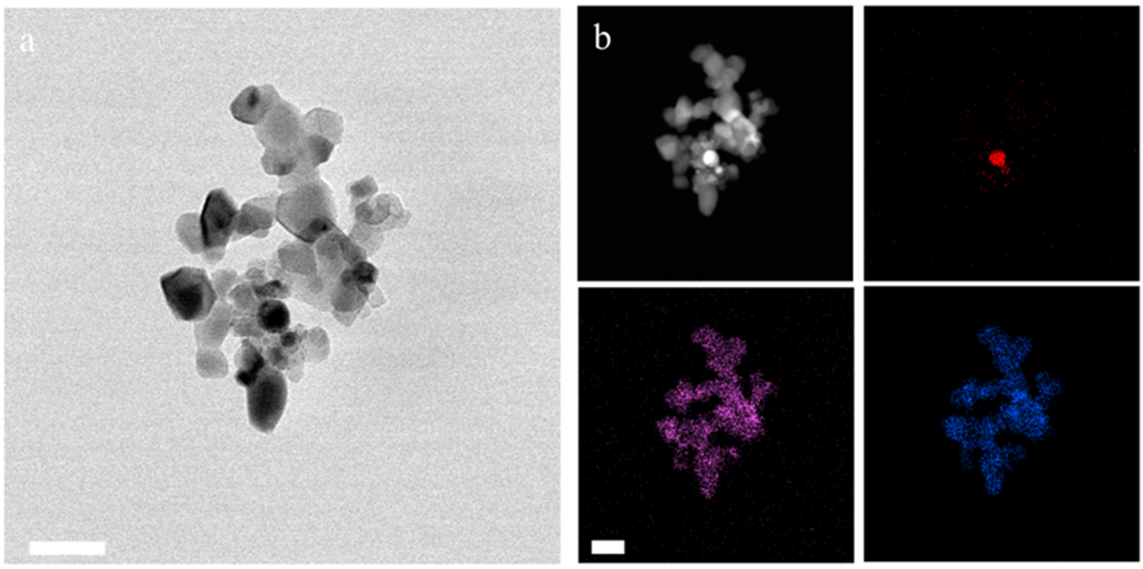

Figure S1. (a) TEM image of Ag-TiO_2, scale bars: 50 nm. (b) STEM image of Ag-TiO_2 and corresponding element mapping (Ag, O, and Ti), scale bars: 50 nm.

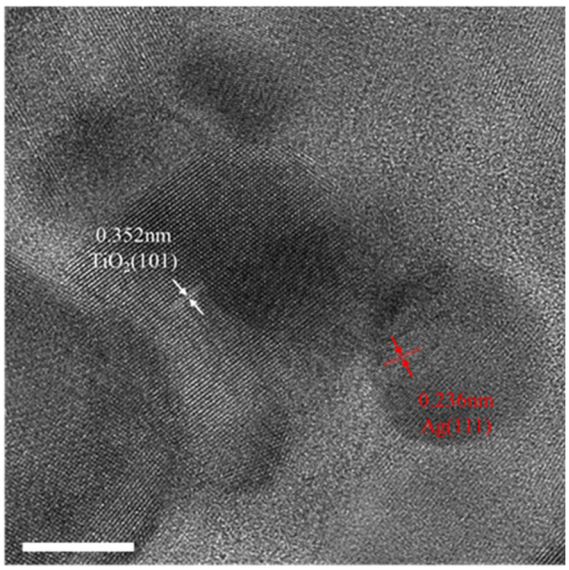

Figure S2. HRTEM image of Ag-TiO_2@SiO_2, scale bars: 10 nm.

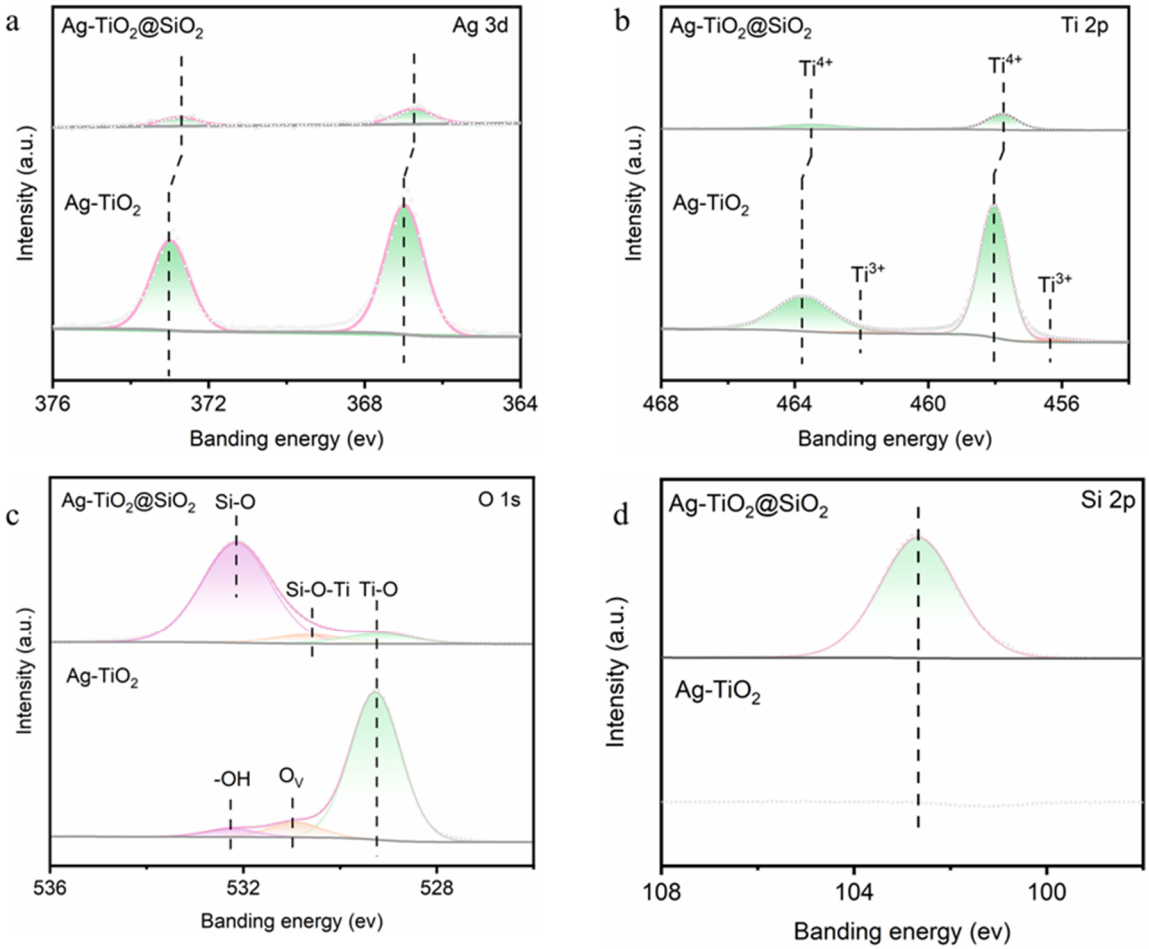

Figure S3. XPS spectra of Ag-TiO_2 and Ag-TiO_2@SiO_2 (a) Ag 3d. (b) Ti 2p. (c) O 1s. (d) Si 2p.

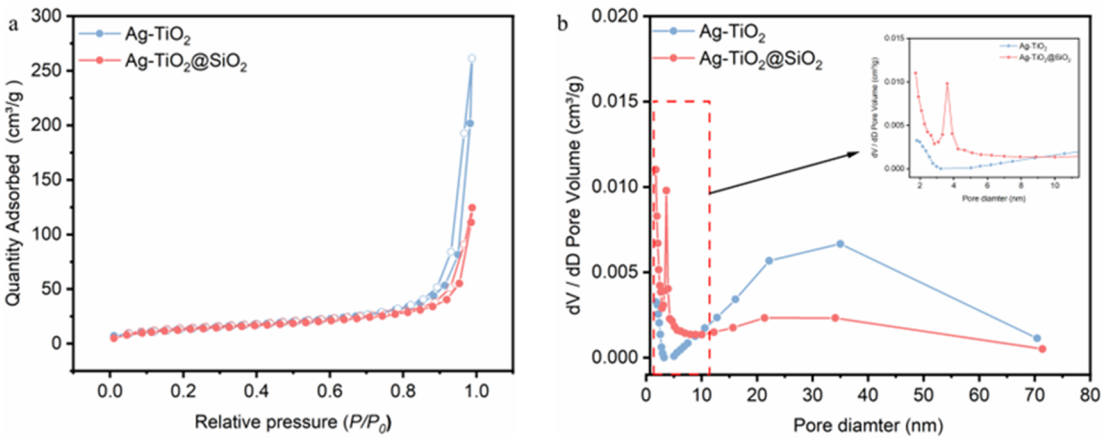

Figure S4. (a) N_2 adsorption-desorption isotherms of Ag-TiO_2 and Ag-TiO_2@SiO_2. (b) pore size distribution curves of Ag-TiO_2 and Ag-TiO_2@SiO_2.

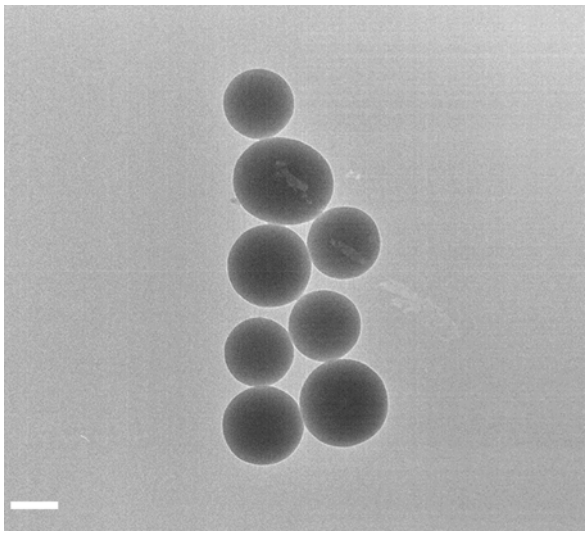

Figure S5. HRTEM image of SiO_2, scale bars: 200 nm.

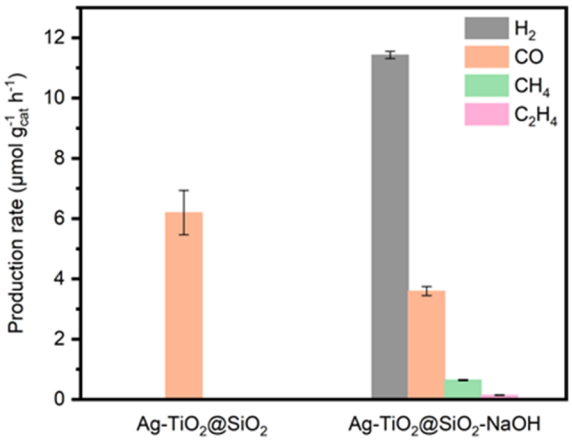

Figure S6. Photocatalytic activity of Ag-TiO_2@SiO_2 and Ag-TiO_2@SiO_2-NaOH.

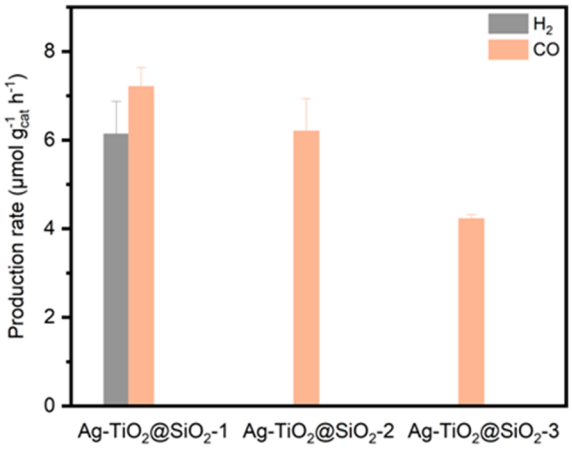

Figure S7. Photocatalytic activity of catalysts with different SiO_2 shell thicknesses for carbon dioxide reduction.

Table S1. Summary of porosity parameters for the Ag-TiO_2 and Ag-TiO_2@SiO_2.

Sample	S_{BET} (m^2 g^{-1})	Pore Size (nm)
Ag-TiO_2	49.98	31.65
Ag-TiO_2@SiO_2	43.27	18.56

Table S2. The loading amounts of Ag in the Ag-TiO_2 and Ag-TiO_2@SiO_2.

Sample	ICP results(wt%)
Ag-TiO_2	0.90%
Ag-TiO_2@SiO_2	0.63%

Table S3. The amount of Ag in the solution before and after the photocatalytic reaction.

Sample	ICP results(μg/ml)
0h	0.0062
4h	2.6359