

Supporting Information

Synergistically Enhanced CO₂ Photoreduction via Mesoporous Silica-Mediated Electronic Modulation and Surface Engineering of Copper-Modified Graphitic Carbon Nitride

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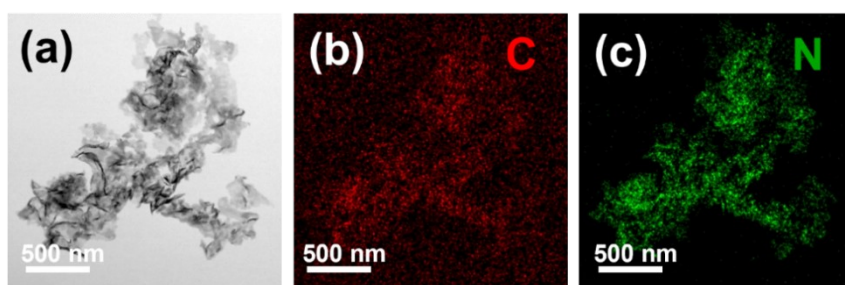


Fig. S1 (a-c) TEM image and EDS elemental mapping of CN.

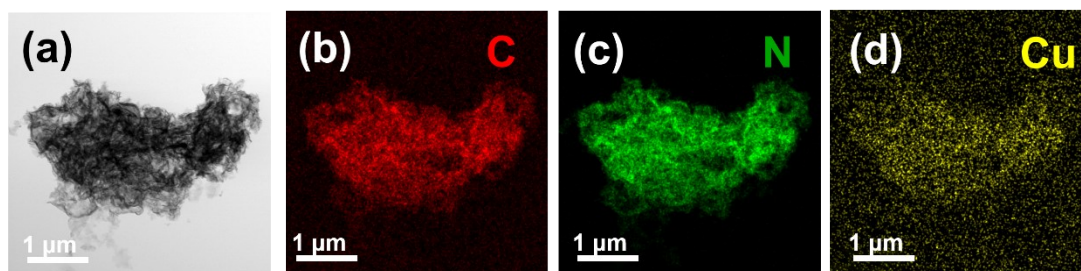


Fig. S2 (a-d) TEM image and EDS elemental mapping of Cu/CN.

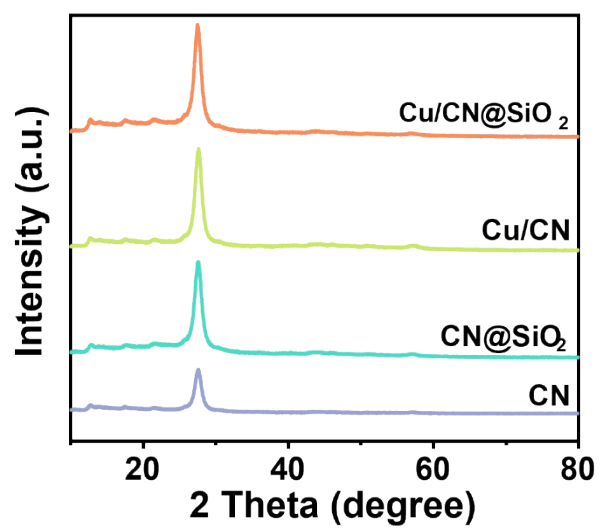


Fig. S3 The XRD patterns of CN, CN@SiO₂, Cu/CN, and Cu/CN@SiO₂.

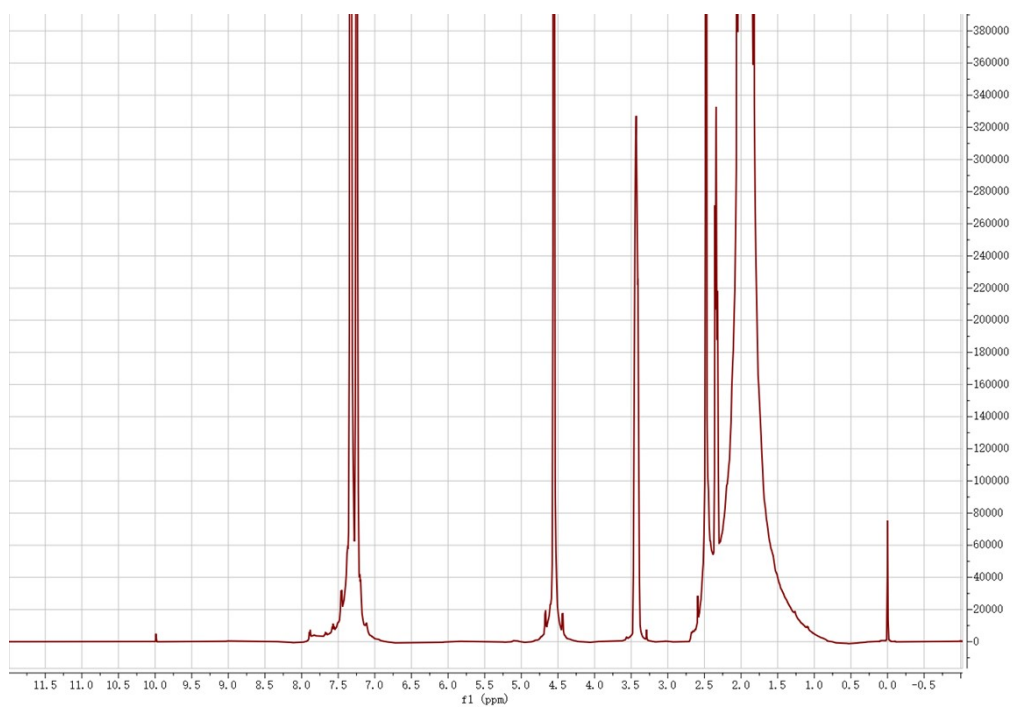


Fig. S4 ^1H NMR spectrum of the reaction solution after photocatalytic testing of the Cu/CN@SiO_2 sample without any liquid products from photocatalytic CO_2 reaction.

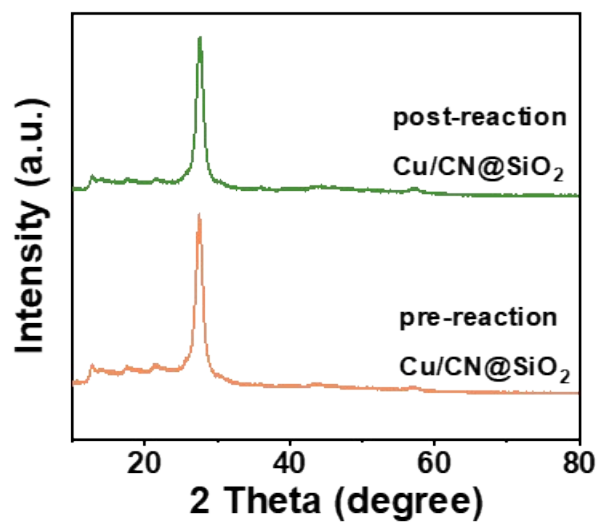


Fig. S5 The comparison about the XRD patterns of Cu/CN@SiO₂ before and after the stability test, correlated to Figure 4c.

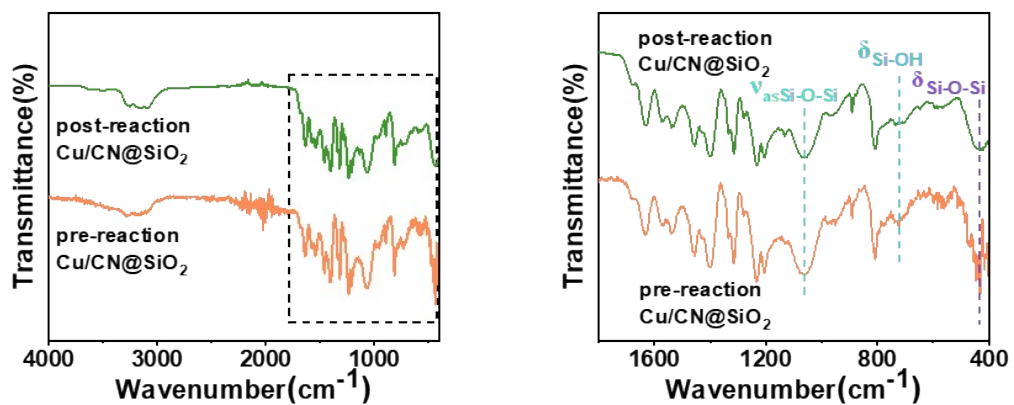


Fig. S6 The comparison about the FT-IR spectra of Cu/CN@SiO₂ before and after the stability test, correlated to Figure 4c.

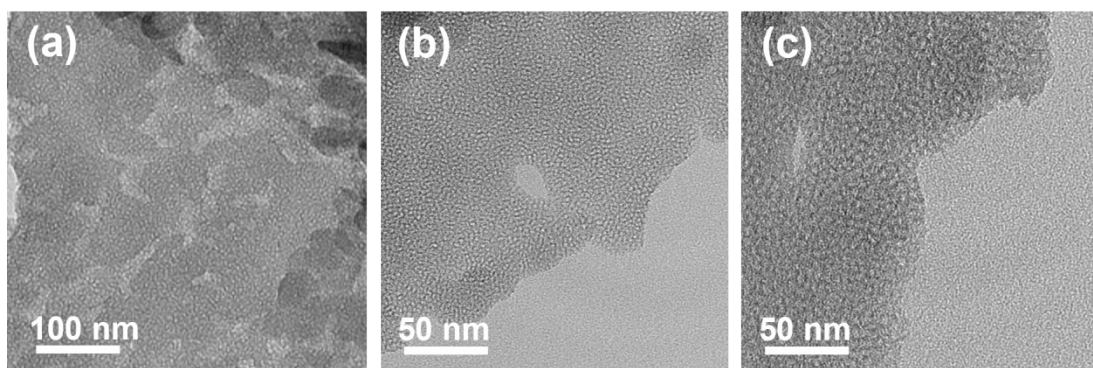


Fig. S7 TEM images of Cu/CN@SiO₂ after the stability test, correlated to Figure 4c.

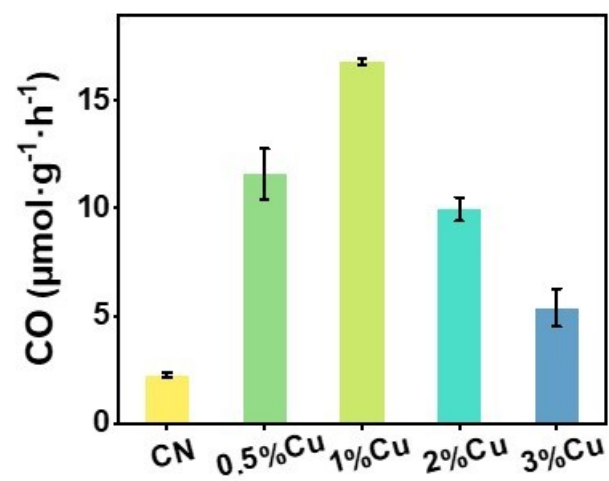


Fig. S8 The CO yields of the samples synthesized with gradient variations in Cu loading via photodeposition were evaluated under photocatalytic conditions using a 300 W Xe lamp equipped with a UV-cutoff filter ($\lambda > 400$ nm).

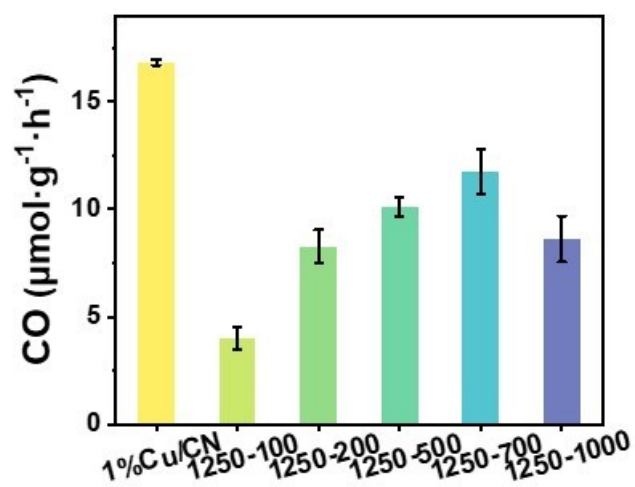


Fig. S9 When the amount of CTAB was fixed at 1250 mg, the CO yields of the samples synthesized with varying TEOS dosages were evaluated under photocatalytic conditions using a 300 W Xe lamp equipped with a UV-cutoff filter ($\lambda > 400$ nm).

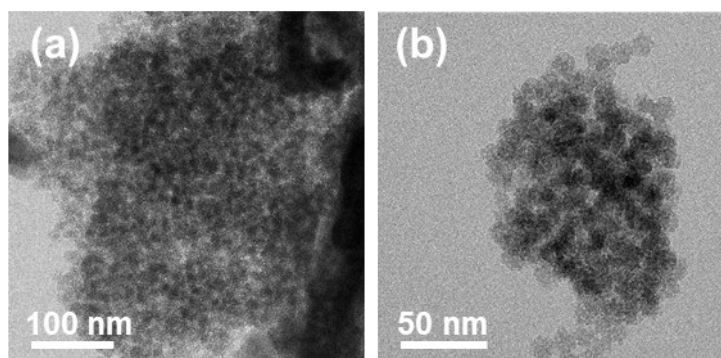


Fig. S10 TEM images of Cu/CN@SiO₂ (When TEOS and CTAB usage are 1250 and 700 mg) correlated to Figure S9.

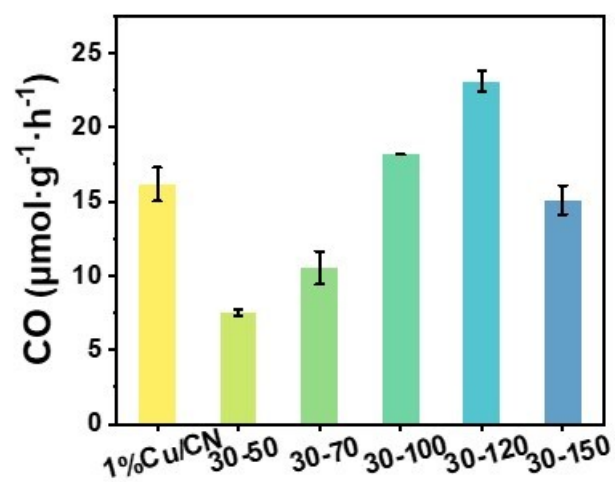


Fig. S11 When the amount of CTAB was fixed at 30 mg, the CO yields of the samples synthesized with varying TEOS dosages were evaluated under photocatalytic conditions using a 300 W Xe lamp equipped with a UV-cutoff filter ($\lambda > 400$ nm).

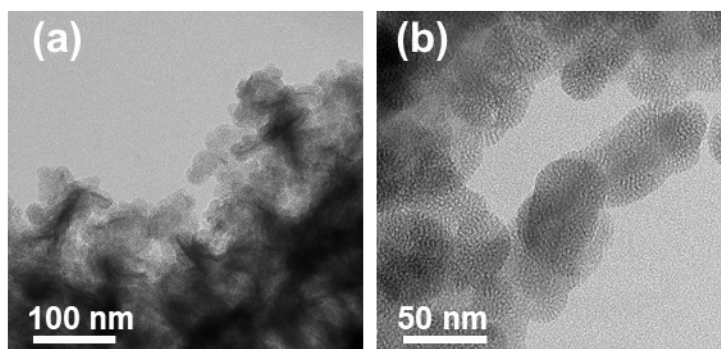


Fig. S12 TEM images of Cu/CN@SiO₂ (When TEOS and CTAB usage are 30 and 120 mg) correlated to Figure S11.

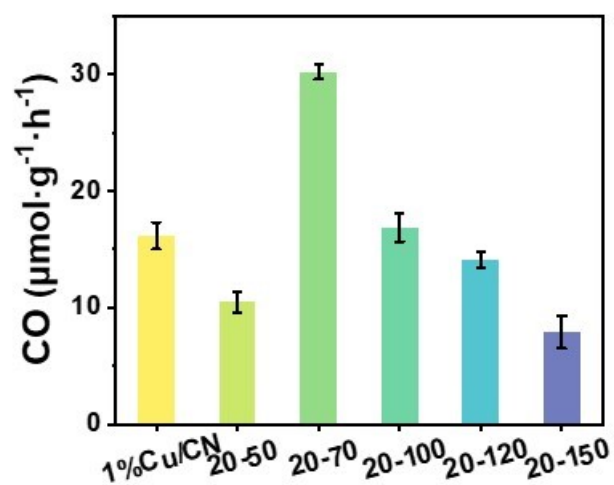


Fig. S13 When the amount of CTAB was fixed at 20 mg, the CO yields of the samples synthesized with varying TEOS dosages were evaluated under photocatalytic conditions using a 300 W Xe lamp equipped with a UV-cutoff filter ($\lambda > 400$ nm).

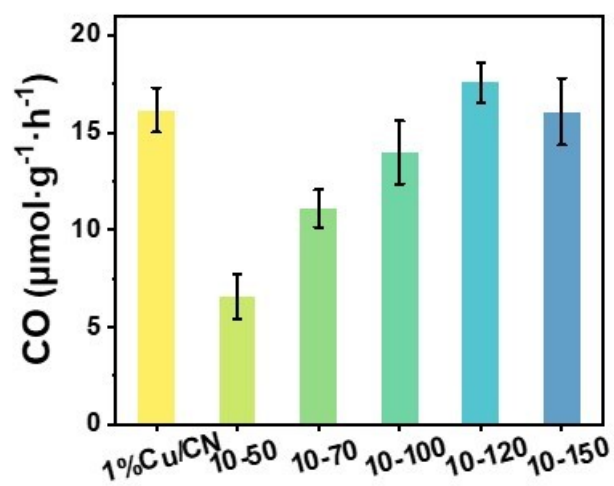


Fig. S14 When the amount of CTAB was fixed at 10 mg, the CO yields of the samples synthesized with varying TEOS dosages were evaluated under photocatalytic conditions using a 300 W Xe lamp equipped with a UV-cutoff filter ($\lambda > 400$ nm).

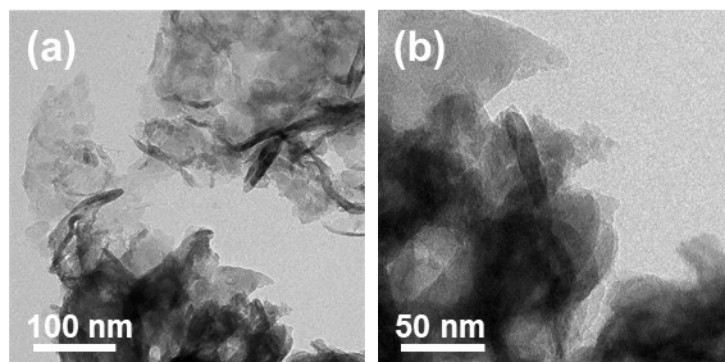


Fig. S15 TEM images of Cu/CN@SiO₂ (When TEOS and CTAB usage are 10 and 120 mg) correlated to Figure S14.

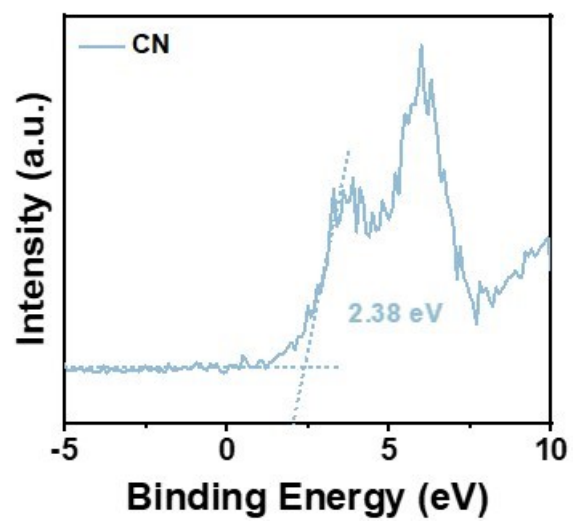


Fig. S16 The VB-XPS spectrum of CN.

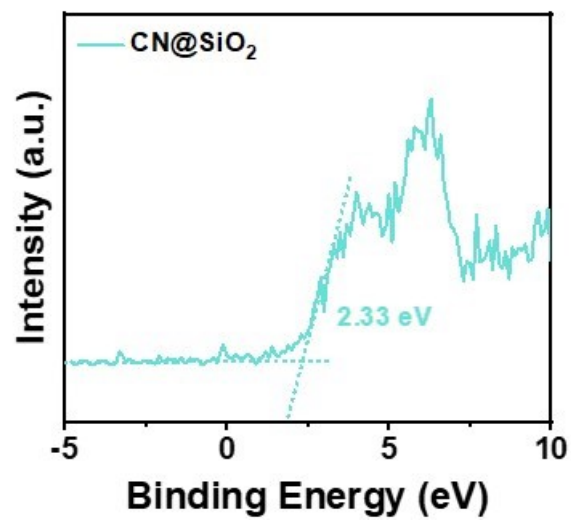


Fig. S17 The VB-XPS spectrum of CN@SiO₂.

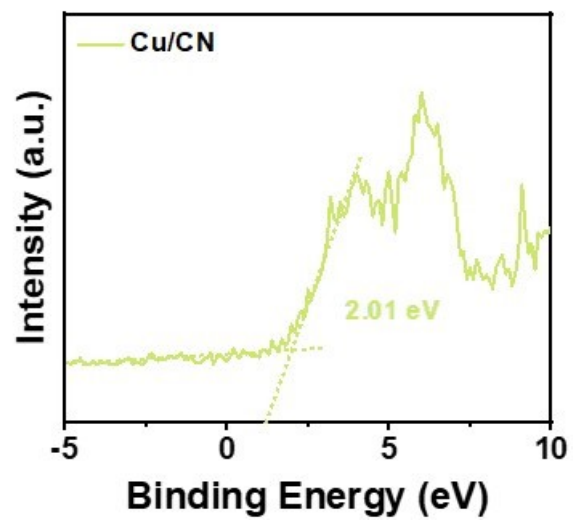


Fig. S18 The VB-XPS spectrum of Cu/CN.

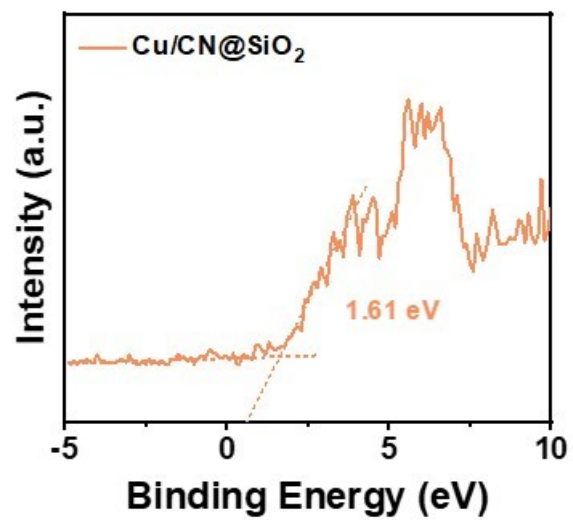


Fig. S19 The VB-XPS spectrum of Cu/CN@SiO₂.