

Supporting information for

**Spontaneous dissociation of CO₂ to CO on defective surface of
Cu(I)/TiO_{2-x} nanoparticles at room temperature**

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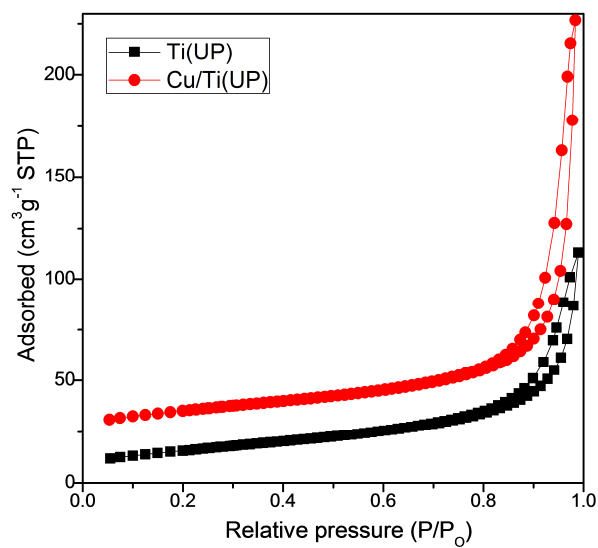


Figure S1. Nitrogen adsorption-desorption isotherms of Ti(UP) and Cu/Ti(UP) samples

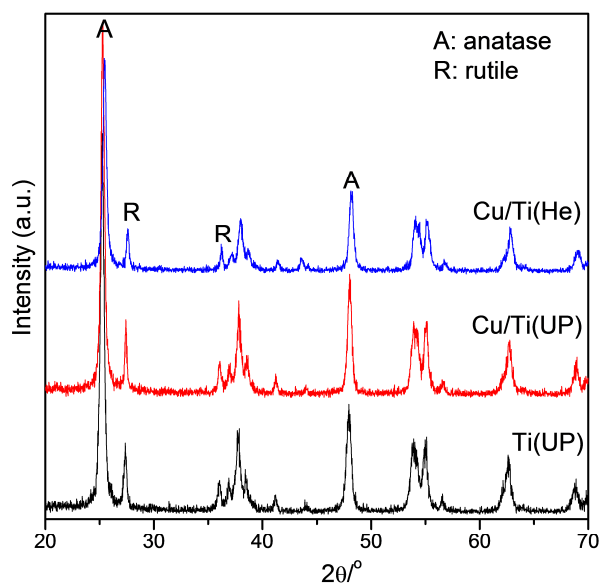


Figure S2. XRD patterns for Ti(UP), Cu/Ti(UP) and Cu/Ti(He) samples

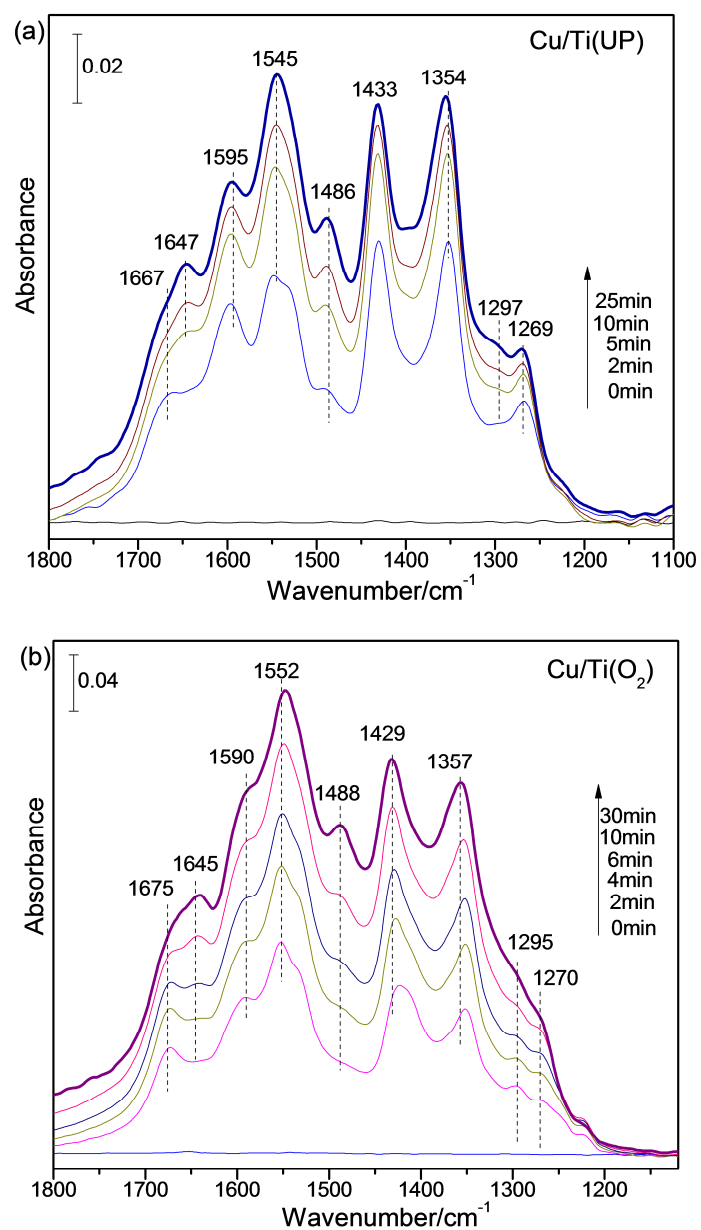


Figure S3. *In situ* DRIFTS spectra of CO₂ interaction with (a) Cu/Ti(UP) and (b) Cu/Ti(O₂) at 25 °C

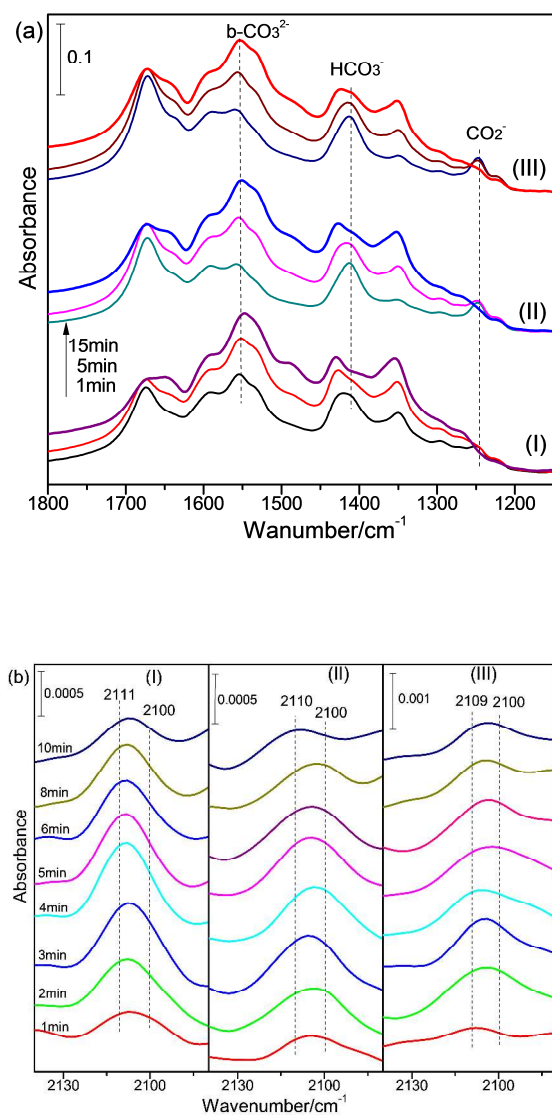


Figure S4. *In situ* DRIFTS spectra for CO₂ interaction with regenerated Cu/Ti(He) that is recycled three times: (a) adsorbed CO₂ species in the range of 1100-1800 cm⁻¹ and (b) the formed Cu⁺-CO at cycles I, II, and III.

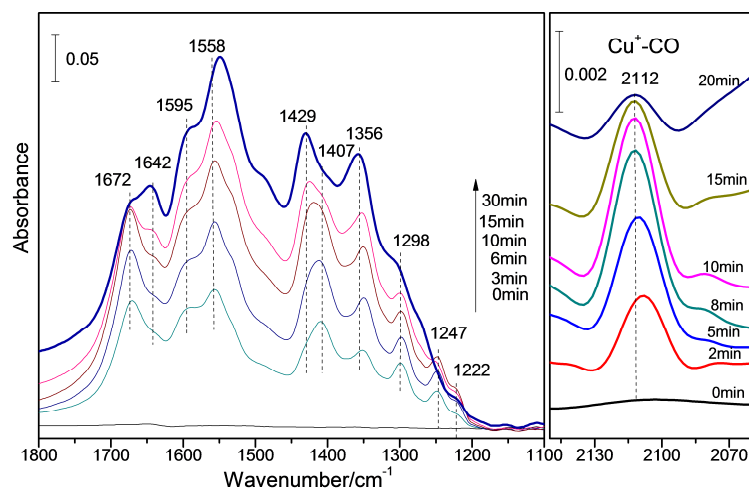


Figure S5. *In situ* DRIFTS spectra for adsorbed CO₂ species in the range of 1100-1800 cm⁻¹ and the formed Cu⁺-CO upon exposing Cu/Ti(He) to CO₂ and photo-illumination (150 W solar simulator) simultaneously.

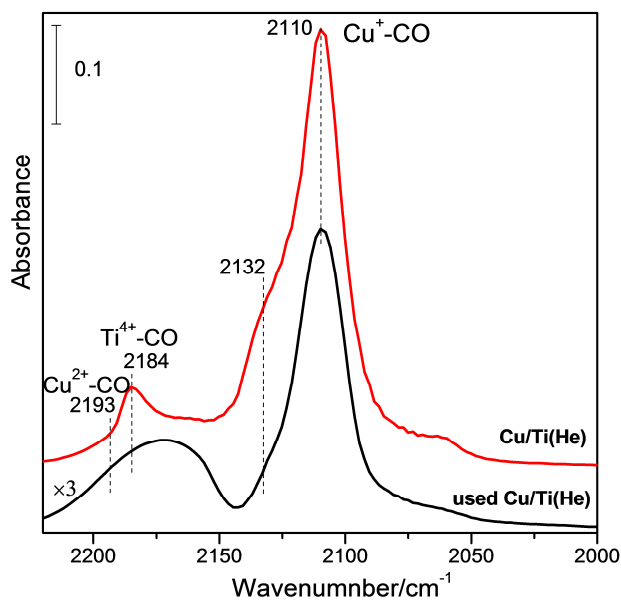


Figure S6. *In situ* DRIFTS spectra for CO adsorption on fresh Cu/Ti(He) and used Cu/Ti(He) after CO₂ photoreduction.

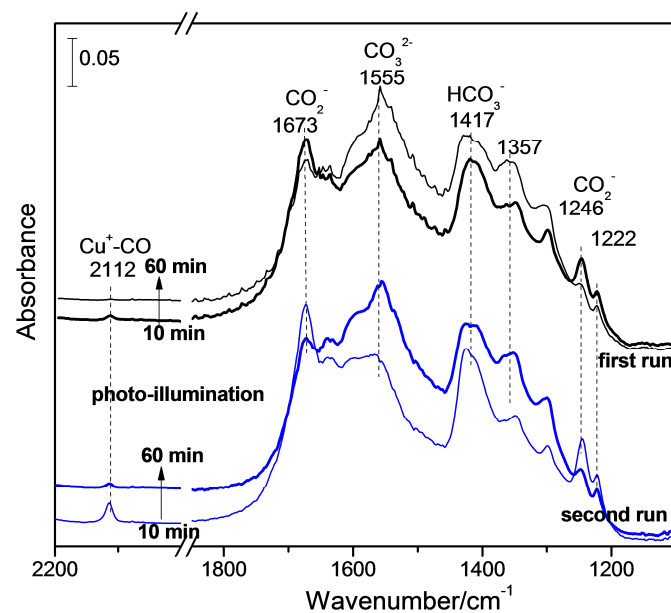


Figure S7. *In situ* DRIFTS spectra for CO₂ photoreduction on Cu/Ti(He) (first run) and regenerated Cu/Ti(He) (second run).