Supplementary Information

Solar CO_2 Reduction using a Molecular Re(I) Catalyst Grafted on SiO_2 via Amide and Alkyl Amine Linkages

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Supplementary Figures

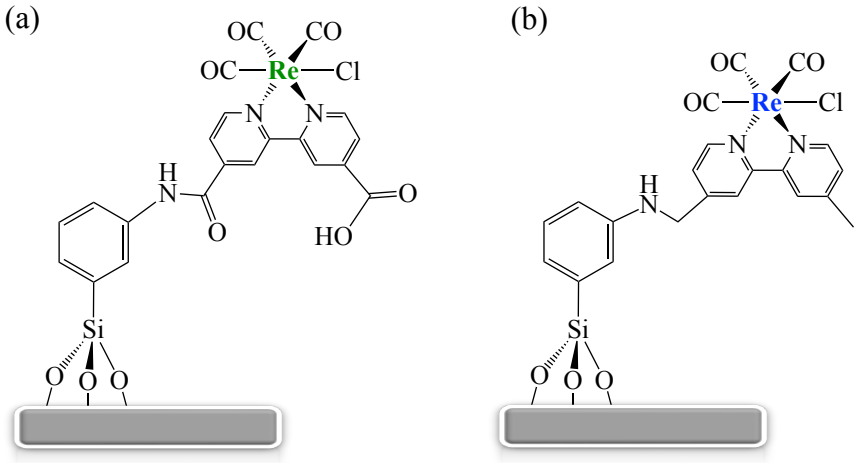

Figure S1. Structures of (a) Re-3-SiO_2 featuring an amide linkage, and (b) Re-4-SiO_2 featuring an alkyl amine linkage.

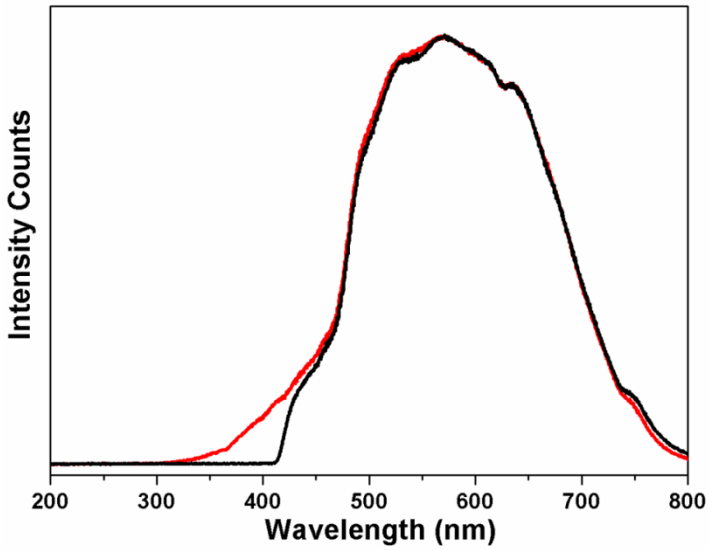

Figure S2. Output spectra of the halogen lamp used in this study without (red trace) and with (black trace) a 420-nm long-pass optical filter.

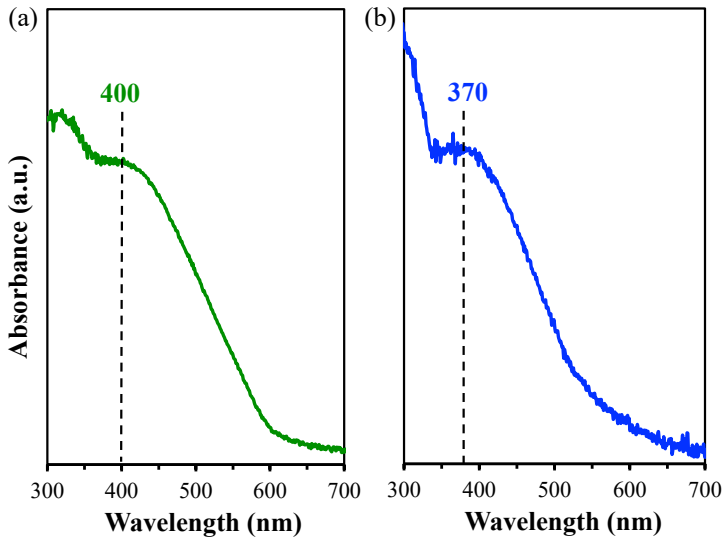

Figure S3. Diffuse reflectance UV-vis spectra of (a) Re-3-SiO_2 and (b) Re-4-SiO_2. Barium sulfate was used as the background.

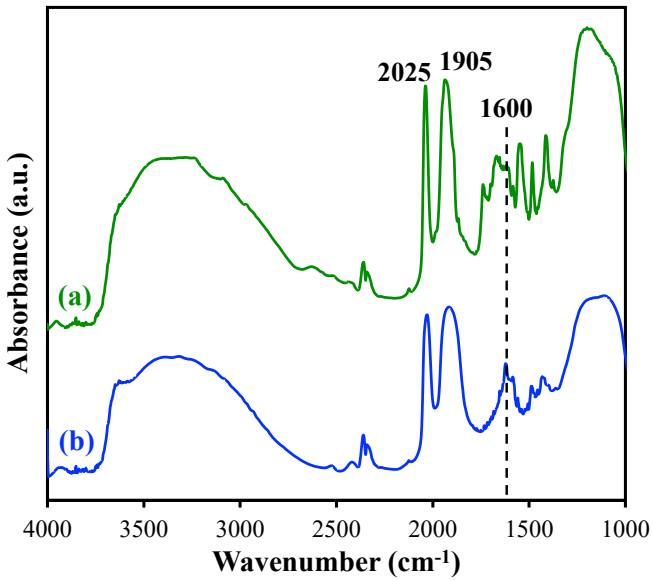

Figure S4. DRIFTS spectra of (a) Re-3-SiO_2 and (b) Re-4-SiO_2. Potassium bromide was used as the background.

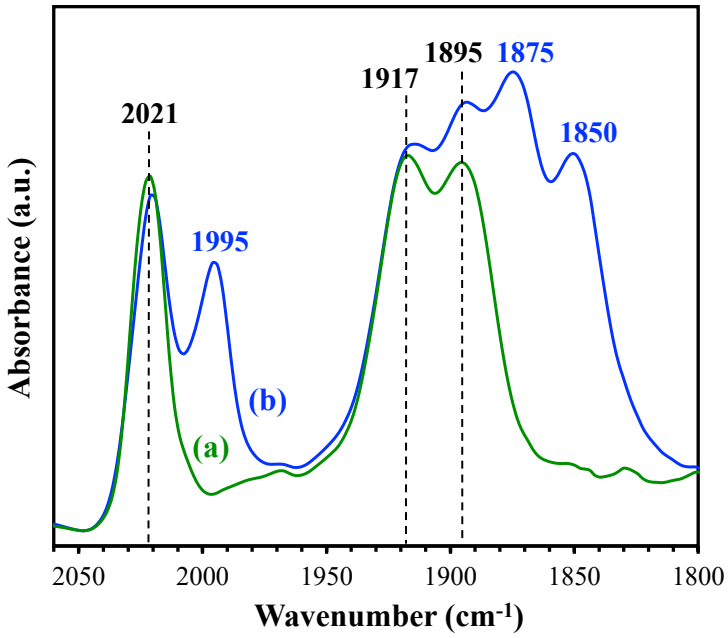

Figure S5. DRIFTS spectra of (a) Re-3-SiO_2 and (b) Re-4-SiO_2 in the presence of TEOA and CO_2.

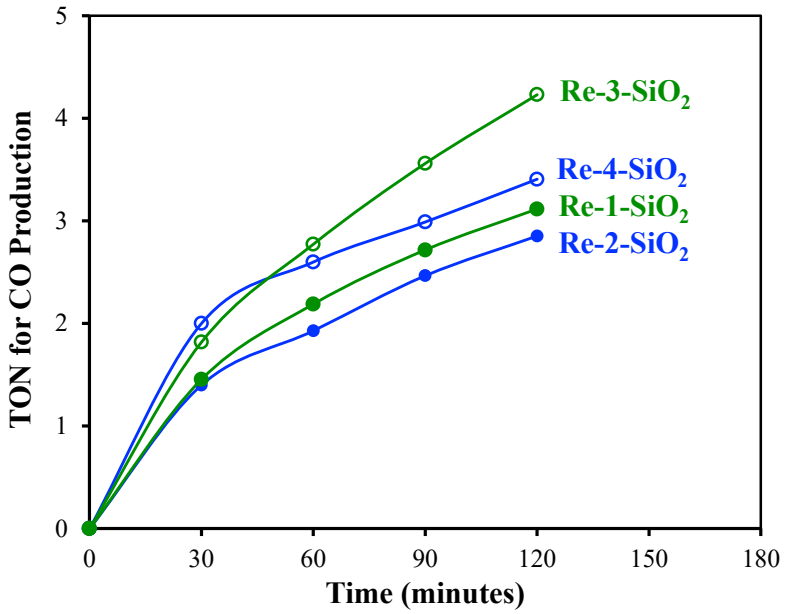

Figure S6. CO production in CO_2 reduction using different heterogenized Re(I) catalysts under simulated solar irradiation (provided by a Xe lamp and an AM1.5 optical filter) in the absence of the Ru(II) photosensitizer. Light intensity was 100 mW/cm^2.

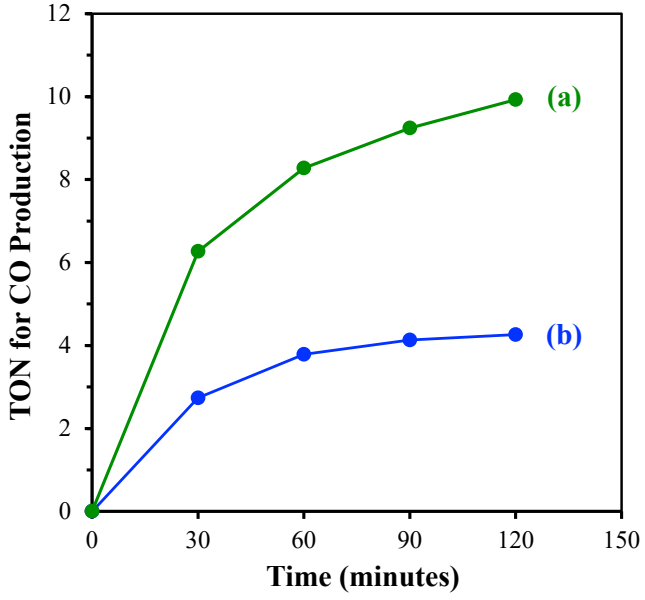

Figure S7. CO production in CO_2 reduction using (a) Re-3-SiO_2 and (b) Re-4-SiO_2 under visible light using a molecular Ru(II) photosensitizer. Light intensity was 100 mW/cm^2. The loadings of Re were determined to be 2.7 and 4.2 µmol per 10 mg of Re-3-SiO_2 and Re-4-SiO_2, respectively.

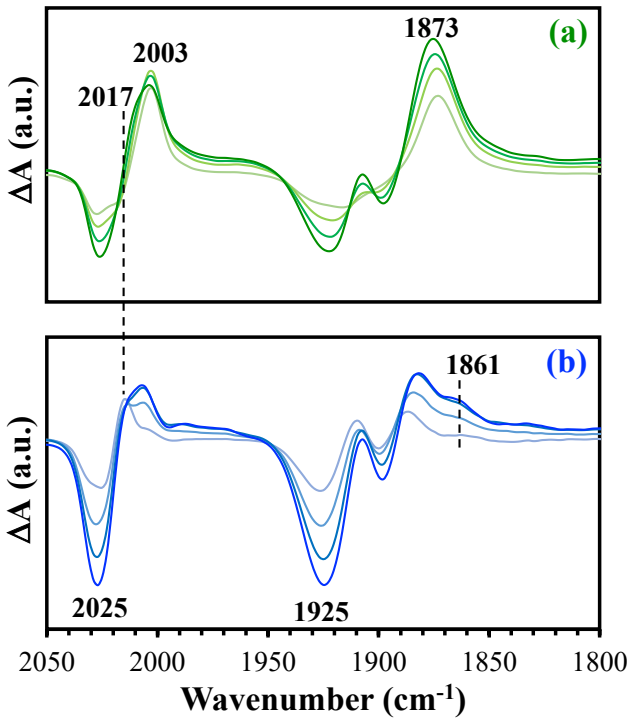

Figure S8. Difference DRIFTS spectra of (a) Re-3-SiO_2 and (b) Re-4-SiO_2 upon light irradiation in the presence of TEOA and CO_2. The spectra were obtained by subtracting spectra collected before light irradiation (t = 0) from corresponding spectra collected after light irradiation for different times (2, 10, 30, and 60 min).