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## Material and Methods:

### **Experimental instruments**

Fourier-transformed infrared (FT-IR) spectra were collected in ATR mode (4000 to 600 cm<sup>-1</sup>, Bruker Vertex 70 FT-IR spectrometer). In-Situ Fourier-transformed infrared (FT-IR) spectra were collected in pure solid mode (4000 to 600 cm<sup>-1</sup>, NICOLET, iS50 FT-IR spectrometer). The <sup>1</sup>H NMR spectra were measured on a Bruker AV400 spectrometer. The ESI-MS data were recorded with a PerkinElmer ELAN DRC-e LCMS system. Solid-State <sup>13</sup>C CP/MAS NMR spectra were measured by a WB 400 MHz Bruker Advance II spectrometer (contact time of 2 ms, ramp 100 and pulse delay of 3 s). The Brunauer-Emmett-Teller (BET) surface areas and pore sizes were measured by a Micrometrics ASAP 2020 M surface area and porosity analyzer. Pore size distributions were calculated based on a non-local density functional theory (NLDFT). Elemental analysis (EA) were measured by a VarioMicrocube Elemental Analyser (Elementar, Germany). Thermogravimetric analysis (TGA) was measured on an instrument (Perkin-Elmer Pyrisl) at the rate of 10 °C/min under oxygen atmosphere up to 800 °C. Photophysical absorption properties of resulting samples were measured by a UV-VIS-NIR spectrophotometer (UV-3600, Shimadzu Japan). Powder X-ray diffraction (XRD) patterns were measured by a Philips X' Pert Pro X-ray diffraction instrument (Cu K $\alpha$  radiation,  $\lambda = 1.5418$  Å). Transmission electron microscopy (TEM) images were observed by a Tecnai G2 F30 (FEI Holland) microscope. Talosf200x (FEI Holland) of High-Resolution Field emission transmission electron microscope (HR-FTEM) observed the sample of Por-CTF. Scanning electron microscopy (SEM) images of resulting samples were measured by a FEI Sirion 200 microscope (FE-SEM). Layered morphologies were observed by atomic force microscopy (scanning probe microscopy SPM-9700 instrument, Shimadzu Japan). X-ray photoelectron spectroscopy (XPS) analysis were measured by an Shimadzu Axis Ultra DLD 600 W instrument. The electron spin resonance (ESR) analysis was conducted with an electron paramagnetic resonance A300-10/12 spectrometer (Bruker AXS Company, Germany). The excitation light employed in recording fluorescence spectra was 362 nm. The photoluminescence (PL) spectra were obtained by a QuantaMaster & TimeMaster Spectrofluorometer (QuantaMaster<sup>TM</sup>40, USA). Raman spectra were measured by a LabRAM HR800 Laser Confocal Raman Spectrometer Raman (Horiba JobinYvon, France). The apparent quantum efficiency (A. Q. E.) was measured under the same photocatalytic reaction condition by different bandpass filter by the eauation below. The  $N_e$ 

means the number of reacted electrons in the system. The  $N_p$  means the number of incident electrons in the same condition. The  $N_a$  means the amount of evolved product under visible light irradiation ( $\lambda > 420 \text{ nm}$ ).

A.Q. E (CO)% = 
$$\frac{N_e}{N_p} * 100\%$$
  
A.Q. E (CO)% =  $\frac{2 * M * N_a * h * c}{S * P * t * \lambda} * 100\%$ 

The selectivity of CO was calculated by the equation below. The N (µmol) refers the envolved product (CO) under visible light irradiation ( $\lambda > 420 \text{ nm}$ ).

Selectivity (CO)% = 
$$\frac{2N(CO)}{2N(CO) + 2N(H_2)} * 100\%$$

## Time-resolved transient absorption spectroscopy measurement:

At ambient conditions, the femtosecond-transient absorption measurements were carried out on a Helios pump-probe system (Ultrafast Systems LLC), which was combined with an amplified femtosecond laser system (Coherent). In the measurement, optical parametric amplifier (TOPAS-800-fs) supplied a 400 nm pump pulse (~20 nJ/pulse at the sample, corresponding to a pump fluence of ~168  $\mu$ /cm<sup>2</sup> providing the typical focus radii of ~150  $\mu$ m)), which was generated by a Ti: sapphire regenerative amplifier (Legend Elite-1K-HE; 800 nm), 35 fs, 7 mJ/pulse, 1 kHz) and seeded with a mode-locked Ti: sapphire laser system (Micra 5) and an Nd: YLF laser (EvolutIon 30) pumped. The white-light continuum (WLC) probe pulses (420-760 nm) was produced by focusing the 800 nm beams (split from the regenerative amplifier with a tiny portion, ~400 nJ/pulse) onto a sapphire plate. A reference beam split from WLC was used to correct the pulseto-pulse fluctuation of the WLC. An optical fiber-coupled multichannel spectrometer (with a CMOS sensor) was used to visualize the temporal and spectral profiles (chirp-corrected) of the pump-induced differential transmission of the WLC probe light (i.e., absorbance change), which was further processed by a Surface Xplorer software. A motorized optical delay line was adopted to vary the time delays (0-8 ns) between the pump and probe pulses. A routine cross-correlation method was used to determine the instrument response function (IRF) to be ~100 fs. A mechanical chopper worked at 500 Hz was adopted to modulate pump pulses so that the fs-TA spectra with and without the pump pulses can be mreasured alternately.



Synthesis of 5, 10, 15, 20-tetrakis(4-formyl-biphenyl)-porphyrin (4-CHO-TBPP):

5, 10, 15, 20-tetrakis(4-bromophenyl)-porphyrin (4-Br-TPP, 0.60 g) and 4-formylphenylboronic acid (0.70 g) were dissolved in 40 mL DMF, 80 mL toluene and 20 mL H<sub>2</sub>O in a three-necked flask, then added 3% Pd(PPh<sub>3</sub>)<sub>4</sub> (0.09 g), the solution was degassed by bubbling with nitrogen for 35 min, then the solution was heated to reflux and reacted for 72 hours under N<sub>2</sub> protection. The product was suction filtered and collected as violet black cake. The crude product was washed with in dichloride methane and then further recrystallized from methanol in 90% yield. MALDI-TOF-MS: Calculated: 1030.34, Found: M/Z: 1030.04.

# Preparation of MnO<sub>x</sub>@Por-CTF-10x, CoO<sub>x</sub>@Por-CTF-10x, NiO<sub>x</sub>@Por-CTF-10x, CuO<sub>x</sub>@Por-CTF-10x, and ZnO<sub>x</sub>@Por-CTF-10x.

Anhydrous manganese chloride (0.1 mmol), cobalt chloride (0.1 mmol), nickel chloride (0.1 mmol), copper chloride (0.1 mmol), or zinc chloride (0.1 mmol) were added to 25 mL DMF in a 50 mL round bottom flask. Then it was added 1.0 mL H<sub>2</sub>O and heat the solution to reflux under nitrogen to form in precursor the solvent as the precursor before loading on Por-CTF for an hour. Then different amount Por-CTF was added, and the suspension was kept stirring under a designated temperature in nitrogen atmosphere under reflux in 150 °C. After 24 hours, the heating was stopped. The resulting suspension was subjected to vacuum filtration and washed by deionized water and methanol for several times to remove the residuals. The resulting powder sample was heated in a blast oven at 160 °C for 24 hours to make it fully dehydrated and converted into the metal oxide. Finally, it was vacuum dried at 90 °C for 24 hours.

## Preparation of α-Fe<sub>2</sub>O<sub>3</sub> nanoparticle

Anhydrous ferric chloride (162 mg, 0.1 mmol) was added to 25 mL DMF in a 50 mL round bottom flask, then added 1.0 mL H<sub>2</sub>O and heat the solution to reflux under nitrogen to form FeOOH in the solvent. The suspension was kept stirring under a designated temperature in nitrogen atmosphere under reflux in 150 °C. After 24 hours, the heating was stopped, and the resulting suspension was separated by centrifuge (8000 r/min) and washed by deionized water and methanol for several times to remove the residuals.



Figure S1. MALDI-TOF-MS spectrum of 4-CHO-TBPP monomer



Figure S2. (a-b) FT-IR spectra of 4-CHO-TBPP,  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>, Por-CTF and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF samples.



Figure S3. (a) Solid-state <sup>13</sup>C NMR spectrum of Por-CTF. (b) TGA test of Por-CTF, and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x in O<sub>2</sub>.



Figure S4. XPS spectra for (a) C 1s and (b) N 1s of Por-CTF.



**Figure S5.** (a) TEM image of Por-CTF. (b) HR-TEM images of Por-CTF. (c) HAADF-STEM images of Por-CTF. EDX mapping of (d) C-K (cyan), (e) N-K (purple), (f) C-K and N-K of Por-CTF (blue).



**Figure S6.** (a) TEM image of bear  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>. (b-c) HR-TEM image of bear  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>. (d) FFT image. (e) PXRD of bear  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>. (f) Theoretical structure model of bear  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> (side view). (g) Top view of bear  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>.



**Figure S7.** TEM images and α-Fe<sub>2</sub>O<sub>3</sub> particle size distributions of (a-c) α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-5x, (d-f) α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x and (g-i) α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-15x.



**Figure S8.** (a) HAADF-STEM images of α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x. (b-e) EDX mapping of N-K(orange), O-K(yellow) and Fe-K(green) of α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x.



**Figure S9.** Scanning electron microscopy image and energy dispersive X-ray (EDX) spectrums from HAADF-STEM measurement of α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x.



**Figure S10**. The high-resolution XPS spectra for (a) C 1s and (b) N 1s of Por-CTF and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x. (c) The high-resolution XPS spectra for Fe 2p of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x.



Figure S11. (a) High resolution XPS Fe2p spectra. (b) High resolution XPS C1s of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>.



**Figure S12.** (a) Mott-Schottky plots for Por-CTF in 0.2 M Na<sub>2</sub>SO<sub>4</sub> aqueous solution. (b) Mott-Schottky plots of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> in 0.2 M Na<sub>2</sub>SO<sub>4</sub> aqueous solution. (c) UV-vis spectra of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x in the solid state. (d) Bandgap width of Por-CTF,  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x.



Figure S13. The schematic diagram of the photocatalytic device.



Figure S14. Carbon monoxide and hydrogen gas standard curve.



Figure S15. Comparison of (a) TEM images and (b) FT-IR spectrum before and after catalysis for  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x.



**Figure S16.** (a) Photocatalytic CO evolution performance of the photocatalysts (20 mg) of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x in 5ml pure DMF (without sacrificial agent and PS). (b) Photocatalytic performance of CO evolution with different ratio of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>. (c) Recyclability and stability experiments. (d) CO<sub>2</sub> adsorption curves in 298K and 273 K.



**Figure S17.** CO and H<sub>2</sub> production rates of heterojunction systems of 20 mg  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x and (a) 20 mg (28  $\mu$ mol) Ru(bpy)<sub>3</sub>Cl<sub>2</sub>, (b) 10 mg (14  $\mu$ mol) Ru(bpy)<sub>3</sub>Cl<sub>2</sub> and (c) 5 mg (7  $\mu$ mol) Ru(bpy)<sub>3</sub>Cl<sub>2</sub>.



**Figure S18.** CO and H<sub>2</sub> production rates of hybrid system for 5 mg (7  $\mu$ mol) Ru(bpy)<sub>3</sub>Cl<sub>2</sub> and (a) 20 mg  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x, (b) 10 mg  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x and (c) 5 mg  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x. d) The comparison of three different conditions for CO<sub>2</sub> photoreduction.



**Figure S19.** GC-MS analysis result of CO produced from  ${}^{13}CO_2$  isotope experiment of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x/Ru(bpy)<sub>3</sub>Cl<sub>2</sub>. (a) GC-MS chromatographic peak curve of TIC detector and (b) Mass spectrometry of gas product  ${}^{13}CO$ .



Figure S20. <sup>1</sup>H NMR spectra of the solution part (a) before and (b) after photocatalysis.



**Figure S21**. (a)  $N_2$  adsorption–desorption isotherms The blue curve is vertical shifted by 100 cm <sup>3</sup> g<sup>-1</sup>), and (b) pore size distribution.



**Figure S22**. (a) Steady state photoluminescent spectra of Por-CTF (red curve) and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x (blue curve). (b) Time-resolved photoluminescent spectra of Por-CTF (red curve) and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x (blue curve). (c) Electrochemical impedance curves of Por-CTF (red),  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x (blue). (d) Time-correlated photocurrent of Por-CTF (red),  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x (blue).



Figure S23. (a) Time-resolved photoluminescent spectra and (b) Time-correlated photocurrent experiments of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-5x (black),  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x (red),  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-15x. (blue).



**Figure S24.** (a) DMPO spin-trapping ESR spectra recorded for •OH of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x in different time under visible light. (b) DMPO spin-trapping ESR spectra recorded for •O<sub>2</sub>- of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x in different time under visible light.



**Figure S25.** DMPO spin-trapping ESR spectra recorded for •OH and •O<sub>2</sub>- in the dark for  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>, Por-CTF, and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x.



**Figure S26.** In-situ FTIR spectra of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x in the presence of ~10 Torr CO<sub>2</sub> at different irradiation times under visible light: (a) carbonate region (1000–1800cm<sup>-1</sup>); (b) CO<sub>2</sub> region (2100–2500 cm<sup>-1</sup>); (c) CO<sub>2</sub> overtone region (3500–3800 cm<sup>-1</sup>); (d) OH stretch region (2800–3500 cm<sup>-1</sup>).



**Figure S27.** In-situ FTIR spectra of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> in the presence of  $\sim$ 10 Torr CO<sub>2</sub> at different irradiation times under visible light.



Figure S28. In-situ FTIR spectra of Por-CTF in the presence of  $\sim 10$  Torr CO<sub>2</sub> at different irradiation times under visible light.



**Figure S29.** Comparison of the in-situ FTIR spectra of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>(red), Por-CTF(black) and  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-10x (blue) in the presence of ~10 Torr CO<sub>2</sub> at different irradiation times under visible light.

Table S1. The results of ICP experiments.

SAMPLE	Fe/Mass Conc (%)	α-Fe <sub>2</sub> O <sub>3</sub> /Mass Conc (%)
Por-CTF	0	0
α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF-5x	8.98	12.83
α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF-10x	18.08	25.83
α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF-15x	20.29	28.99

Table S2 High-resolution XPS Fe2p spectra of α-Fe<sub>2</sub>O<sub>3</sub>, Por-CTF, α-Fe<sub>2</sub>O<sub>3</sub>@Por-CTF-5x, α-

 $Fe_2O_3$ @Por-CTF-10x, and  $\alpha$ -Fe\_2O\_3@Por-CTF-15x.

SAMPLE	Туре	FWHM(eV)	Atomic Conc %	Mass Conc %
Por-CTF	Fe 2p	_	0	0
a-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF-5x	Fe 2p	707.4	7.46	25.25
α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF-10x	Fe 2p	707.5	13.27	38.19
α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF-15x	Fe 2p	708.1	15.64	42.71
α-Fe <sub>2</sub> O <sub>3</sub>	Fe 2p	708.1	25.58	56.38

Catalyst (Used amount)	Cocatalyst Sacrificial agent	Evolution rate (µmol h <sup>-1</sup> )	Evolution rate (µmol g <sup>-1</sup> h <sup>-1</sup> )	References
PCN-222 (20 mg)	/ TEOA	СООН <sup>-</sup> : 6.25	321.5	J. Am. Chem. Soc. 2015, 137, 13440.
Zr-bpdc@RuCO (30 mg)	/ TEOA	CO: 0.09	3.0	J. Am. Chem. Soc. <b>2016</b> , 138, 5159.
COP (50 mg)	/ TEOA	CH <sub>4</sub> : 1.13	22.6	ACS Catal. <b>2018</b> , 8, 4576.
Re-COF (0.9 mg)	/ TEOA	CO: 0.68	755.6	J. Am. Chem. Soc. 2018, 140, 14614.
Re-CTF-py (2 mg)	/ TEOA	CO: 0.70	350.0	<i>Catal. Sci. Technol.</i> <b>2018</b> , 2224.
PEosinY-N (10 mg)	/	CO: 0.33	33.0	Angew. Chem. Int. Ed. <b>2019</b> , 58, 632.
α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF (20 mg)	/	CO: 0.72	36.0	This work
CTP5 (50 mg)	Ionic liquid TEOA	CO: 2.45	49	<i>Green Chem.</i> <b>2017</b> , 19, 5777.
RuRu'@mpg-C <sub>3</sub> N <sub>4</sub> (4 mg)	Ag, EDTA·2Na	COOH <sup>-</sup> : 8.46	1115	J. Am. Chem. Soc. <b>2016</b> , 138, 5159.
ZnIn <sub>2</sub> S <sub>4</sub> -In <sub>2</sub> O <sub>3</sub> (4 mg)	Co(bpy) <sub>3</sub> <sup>2+</sup> TEOA	CO: 12.3	3075	J. Am. Chem. Soc. 2018, 140, 5037.
CTPs-BT (15mg)	Co(bpy) <sub>3</sub> <sup>2+</sup> TEOA	CO: 18.2	1213.3	<i>Chem. Eur. J.</i> <b>2018</b> , 24, 1.
Co <sub>3</sub> O <sub>4</sub> (10 mg)	Ru(bpy) <sub>3</sub> <sup>2+</sup> TEOA	CO: 20.03	2003	<i>Appl. Catal. B: Environ.</i> <b>2017</b> , 200, 141.
NC@NiCo <sub>2</sub> O <sub>4</sub> (1 mg)	Ru(bpy) <sub>3</sub> <sup>2+</sup> TEOA	CO: 26.2	26,200	<i>Energ Environ. Sci.</i> <b>2018</b> , 11, 306.
Ni(TPA/TEG) (3 mg)	Ru(bpy) <sub>3</sub> <sup>2+</sup> TEOA	CO: 26.6	8866.7	<i>Sci. Adv.</i> <b>2017</b> , 3, e1700921.
CoSn(OH) <sub>6</sub> (1 mg)	Ru(bpy) <sub>3</sub> <sup>2+</sup> TEOA	CO: 18.7	18,700	<i>Appl. Catal., B</i> <b>2018</b> , 224, 1009.

 Table S3. Comparison of this work to literature reports for efficiency.

α-Fe <sub>2</sub> O <sub>3</sub> @Por-CTF	$\operatorname{Ru}(\mathrm{bpy})_3^{2+}$	CO: 8.0	400	This work
(20 mg)	TEOA	CO. 8.0	400	I NIS WOFK

Table S4. Comparison of this work to literature reports for A.	.Q.E and selectivity of CO in the
Ru system.	

Catalyst	Cocatalyst	Evolution	AOF	CO <sub>2</sub>	
(used emount)	(used amount)	rate	A.Q.L	reduction	References
(useu amount)	Sacrificial agent	(µmol h <sup>-1</sup> )	(70)	Selectivity	
Co-ZIF-9	$Ru(bpy)_{3}^{2+}(7 mg)$	CO: 41.8	1 / 9	59 00/	Angew. Chem. Int. Ed.
(0.8 µmol)	TEOA	CO. 41.0	1.48	38.0%	<b>2014</b> , <i>53</i> , 1034.
MAF(Co)-X27l-	$Ru(bpy)_3^{2+}$ (7 mg)		2	98.2%	J. Am. Chem. Soc.
OH (0.03 mmol)	TEOA	0			<b>2018</b> , <i>140</i> , 38.
C0 <sub>3</sub> O <sub>4</sub>	$Ru(bpy)_{3}^{2+}(15mg)$	$CO \cdot 20.03$	0.069	77 10/2	Appl. Catal. B: Environ.
(10 mg)	TEOA	0. 20.03		//.170	<b>2017</b> , 200, 141.
Co-ZIF-67	$Ru(bpy)_{3}^{2+}$ (8 mg)	CO: 29.6	1.15	66.6%	Appl. Catal. B: Environ.
(1 mg)	TEOA			00.0%	<b>2017</b> , <i>209</i> , 476.
NC@NiCo <sub>2</sub> O <sub>4</sub>	$Ru(bpy)_{3}^{2+}$ (7 mg)	CO. 26 2	1.07	88.6%	Energ Environ. Sci.
(1 mg)	TEOA	0. 20.2			<b>2018</b> , 11, 306.
Ni(TPA/TEG)	$Ru(bpy)_3^{2+}(1.75 g)$	CO: 26.6	_	100%	Sci. Adv.
(3 mg)	TEOA	0. 20.0			<b>2017</b> , 3, e1700921.
CoSn(OH) <sub>6</sub>	$Ru(bpy)_{3}^{2+}(10mg)$	CO: 19.3	1.16	86.5%	ACS Sustainable Chem.
(1 mg)	TEOA				Eng. 2018, 6, 781.
Ni MOLs	$Ru(bpy)_3^{2+}(7.5mg)$	CO: 12.5	2.2	97.8%	Angew. Chem. Int. Ed.
(1 mg)	TEOA				<b>2018</b> , <i>57</i> , 16811.
Ni-TpBpy-COF	$Ru(bpy)_{3}^{2+}(6.5mg)$	CO: 8.1	-	96.0%	J. Am. Chem. Soc. 2019,
(10 mg)	TEOA				<i>141</i> , 7615.
α-Fe <sub>2</sub> O <sub>3</sub> @Por-	$Ru(bpy)_3^{2+}(5mg)$	CO: 8.0	1 / 3	3 <b>93.0%</b>	This work
CTF (20 mg)	TEOA		1.43		