Supplementary Information for

Light responsive metal-organic frameworks as a controllable CO-releasing cell culture substrate

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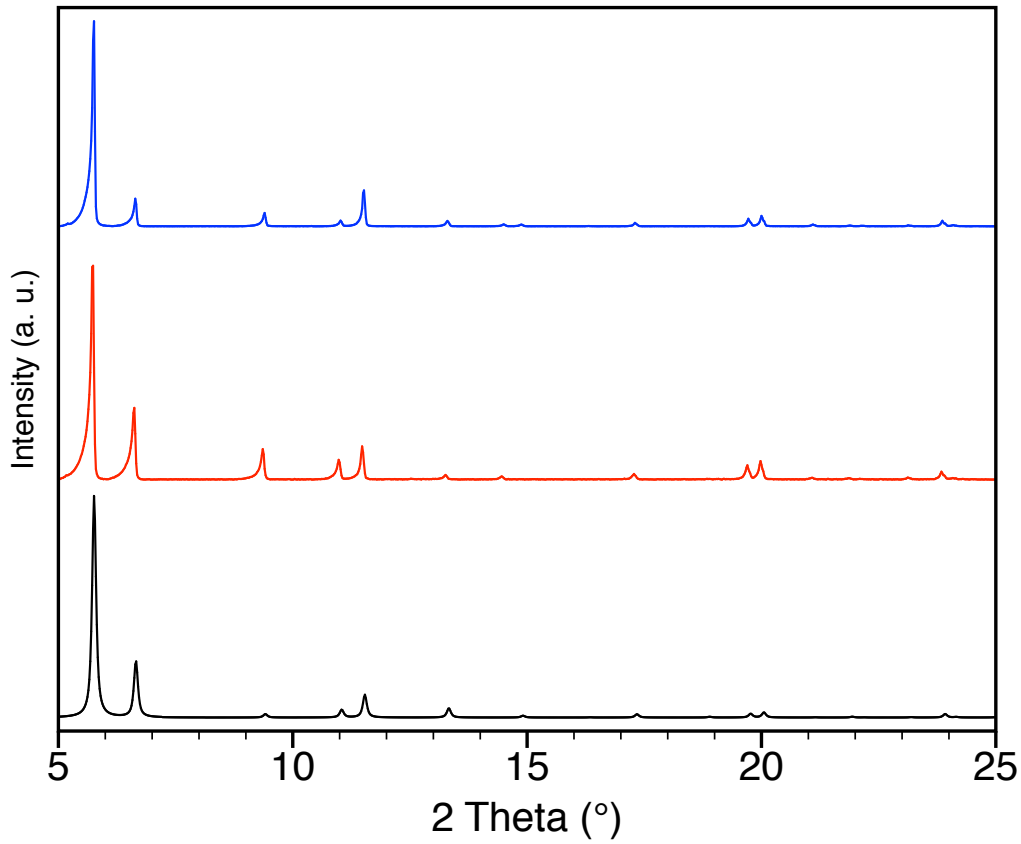

Figure S1. Simulated PXRD of UiO-67 (black) and experimental UiO-67-bpy synthesized in the presence of 30 eqv (red) and 90 eqv (blue) of acetic acid as modulators.

Table S1. Loading efficiency of the samples used in this study.

Sample	XRF	EDX
CORF-1_Small_Non incubated*	39.6 ± 0.9	42.0 ± 4.5
CORF-1_Small_79	79.3 ± 0.5	77.3 ± 2.8
CORF-1_Small_95	95.1 ± 1.4	90.3 ± 7.0
CORF-1_BIG_60	60.1 ± 1.4	59.3 ± 6.1

*Sample prepared by directly heating at 90°C for 2 h a mixture of $MnBr(CO)_5$ and UiO-67. Error are obtained from the standard deviation of three replicates.

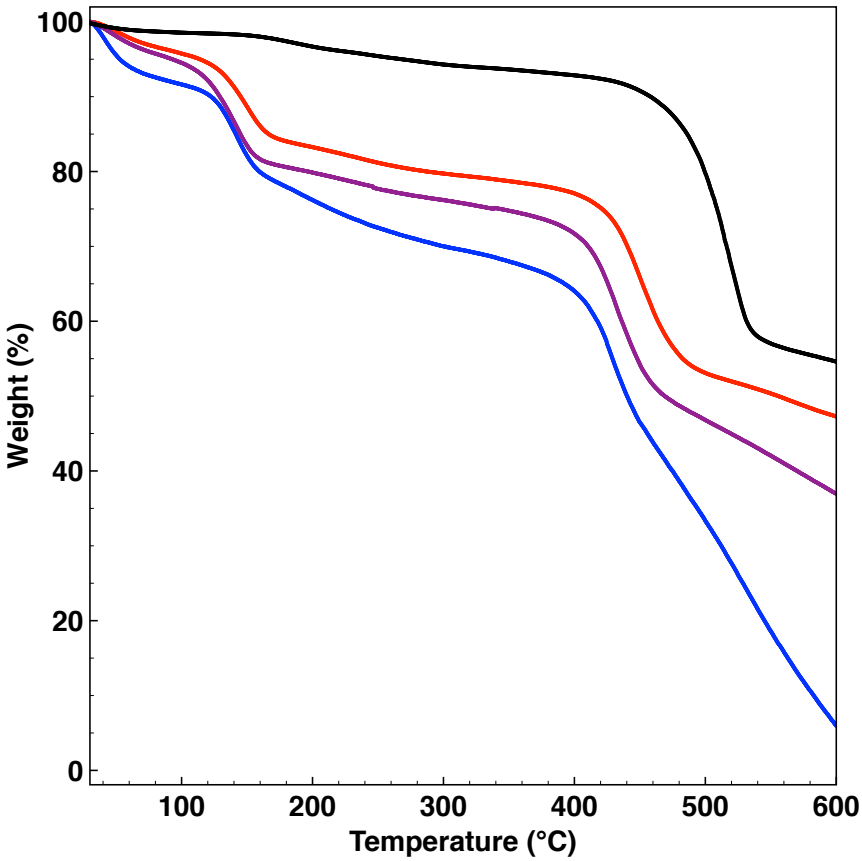

Figure S2. TGA analysis of UiO-67-bpy (black), **CORF-1_small_79** (blue), **CORF-1_small_95** (purple) and **CORF-1_big_60** (red). All CORF-1 samples show a two step decomposition process. The first one, between 80°C – 160°C, corresponds to the loss of CO molecules.[1] Decomposition of the framework starts at 400°C.

Table S2. Expected and experimental weight loss between 80 °C – 160 °C, attributed to the thermally induced release of CO, for the samples used in this study.

Sample	Theoretical weight loss (%)	Experimental weight loss (%)
CORF-1_Small_79	12.62	12.86
CORF-1_Small_95	14.11	13.86
CORF-1_BIG_60	10.31	11.37

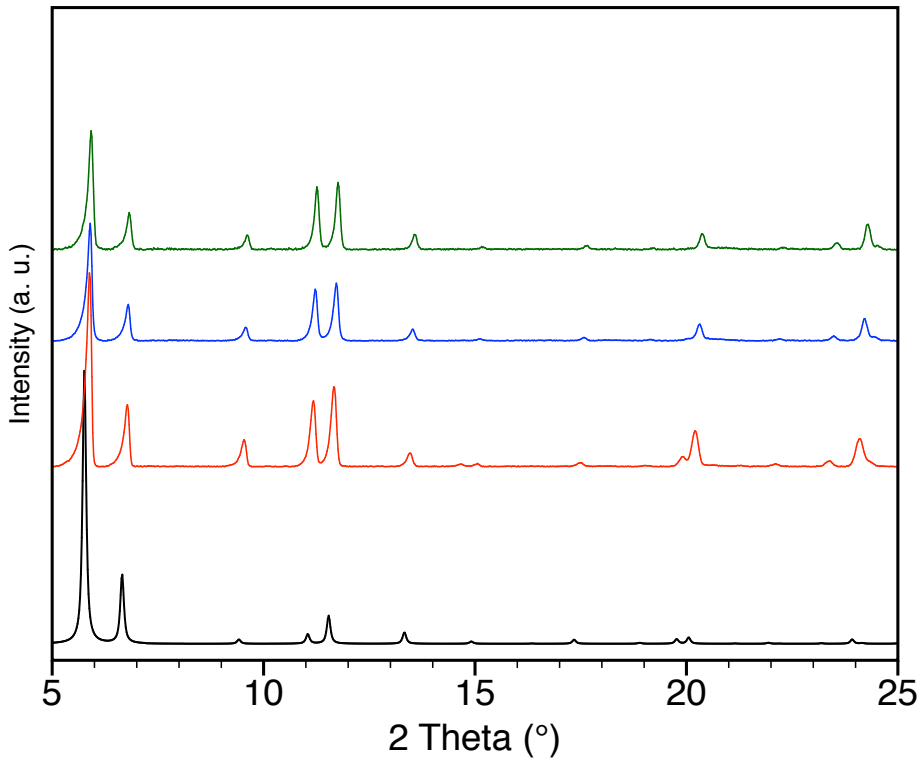

Figure S3. Simulated PXRD of UiO-67 (black) and experimental **CORF-1_big_60** (red), **CORF-1_small_79** (blue), **CORF-1_small_95** (green).

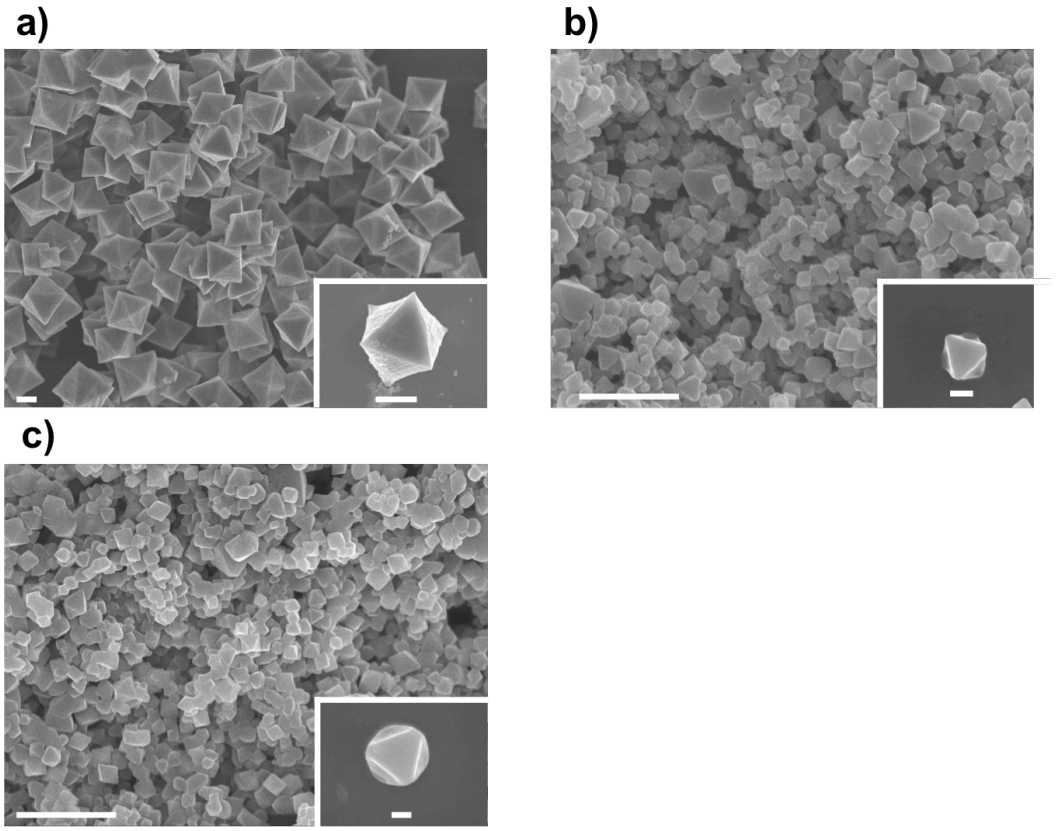

Figure S4. Representative FESEM images of **CORF-1_big_60** (a), **CORF-1_small_79** (b), **CORF-1_small_95** (c). Scale bar 1 μm and 500 nm (inset a) and 100 nm (inset b and c).

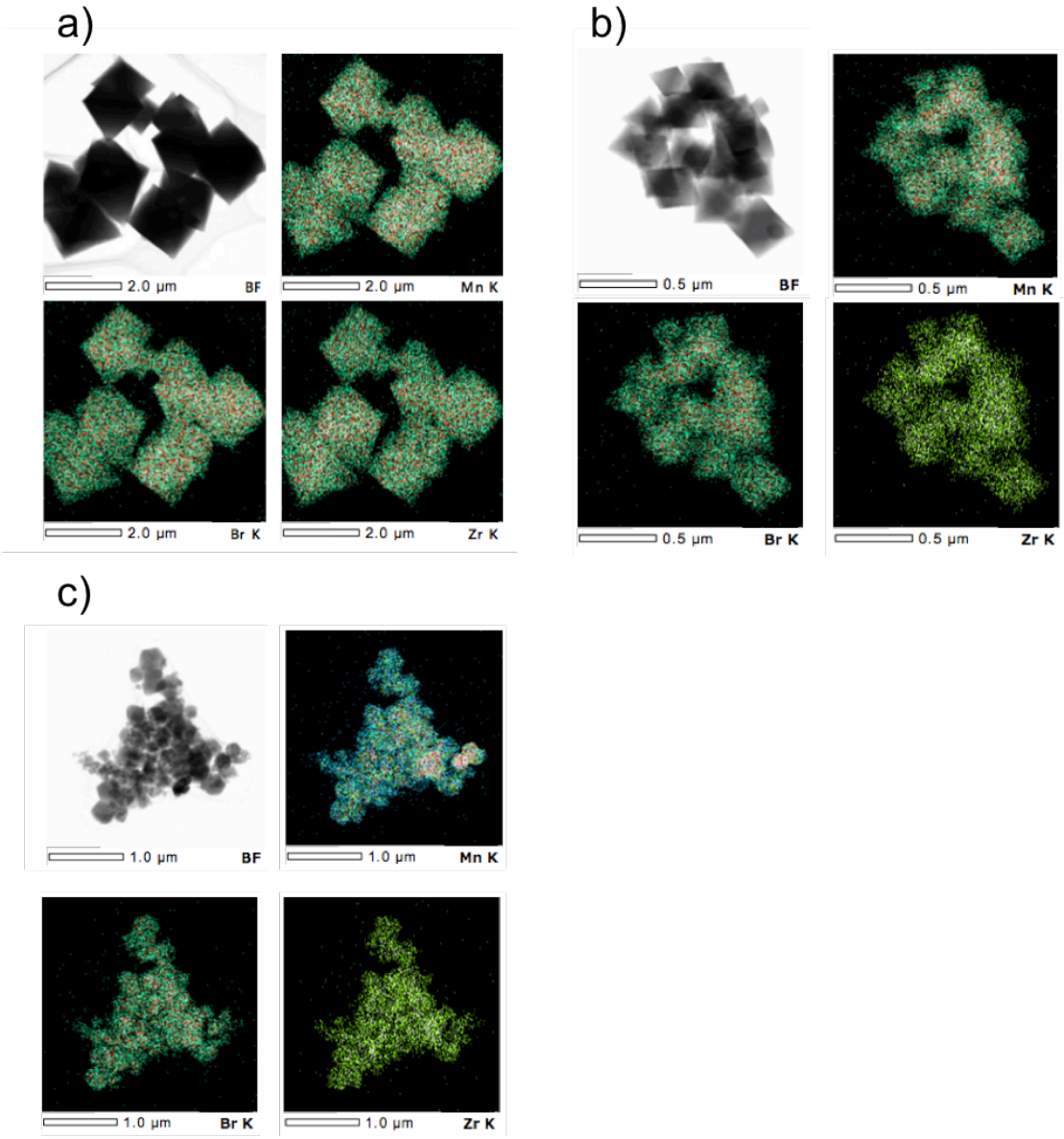

Figure S5. Representative TEM-EDX mapping of **CORF-1_big_60** (a), **CORF-1_small_79** (b), **CORF-1_small_95** (c).

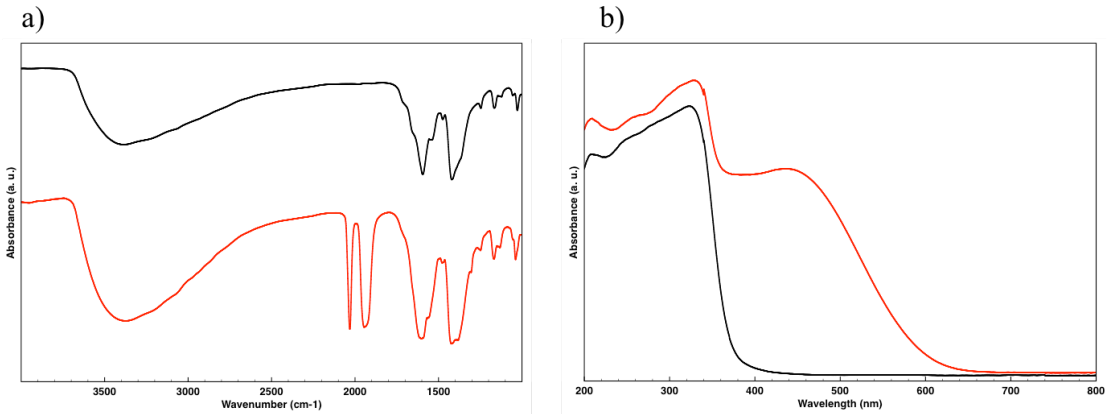

Figure S6. a) FTIR of UiO-67-bpy (black) and **CORF-1** (red). b) Solid state UV-VIS spectra of UiO-67-bpy (black) and **CORF-1** (red).

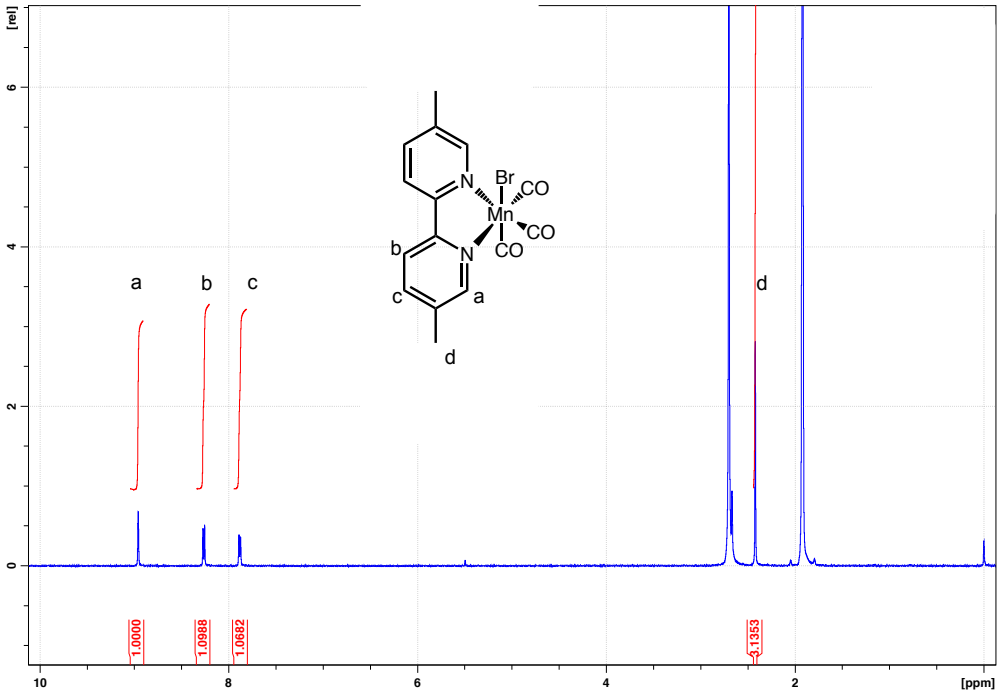

Figure S7. NMR of $MnBr(dmbpy)(CO)_3$ in acetone-d^6.

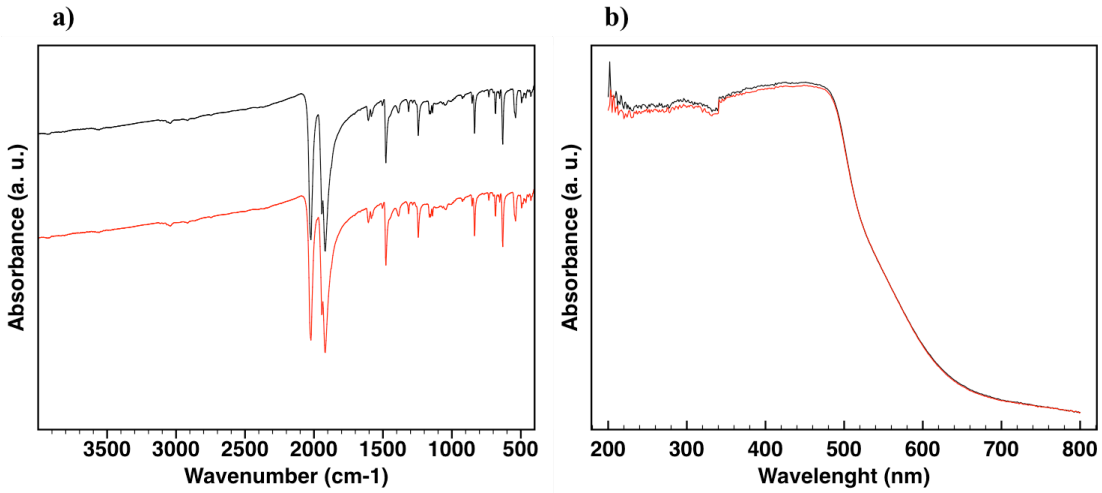

Figure S8. (a) FTIR spectra of MnBr(dmbpy)$(CO)_3$ before (black) and after (red) irradiation at 460 nm for XX min. (b) UV-VIS spectra of MnBr(dmbpy)$(CO)_3$ before (black) and after (red) irradiation at 460 nm for 90 min at 300 w of light power.

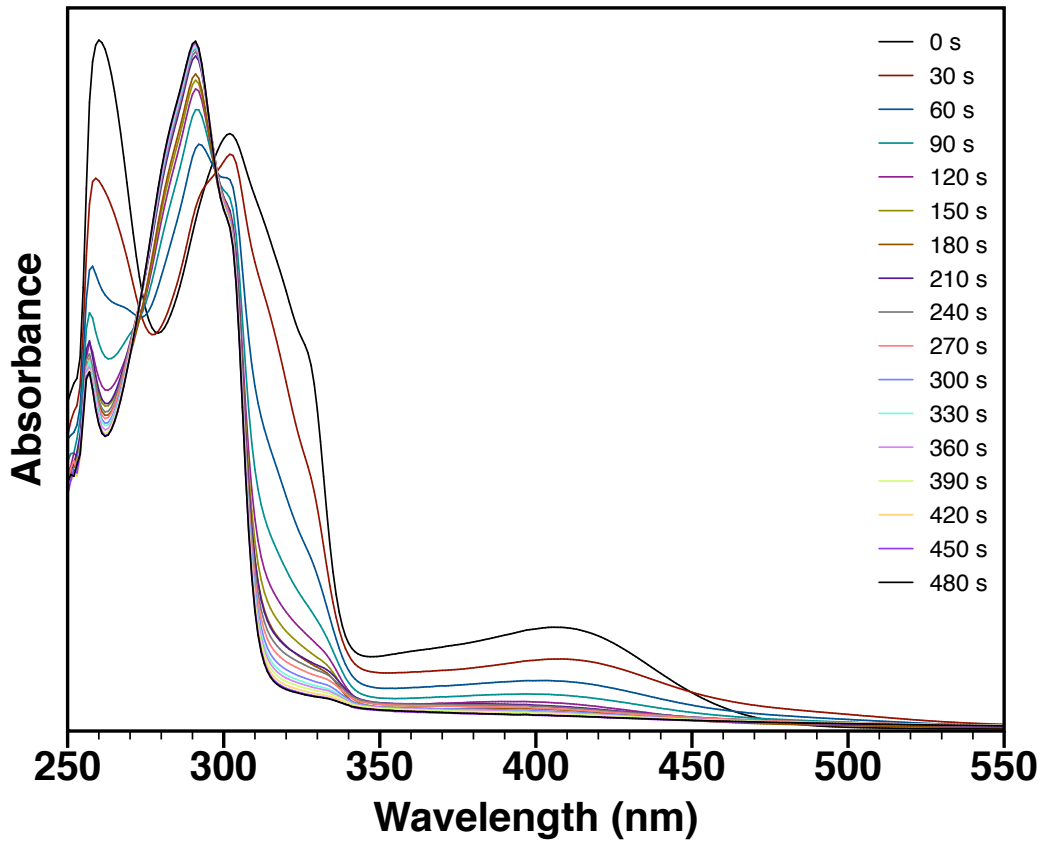

Figure S9. Changes in the UV-Vis spectra of a solution of $MnBr(dmbpy)(CO)_3$ (0.04 mM) in DMSO solvent upon irradiation at 460 nm. Legend indicates the irradiation time.

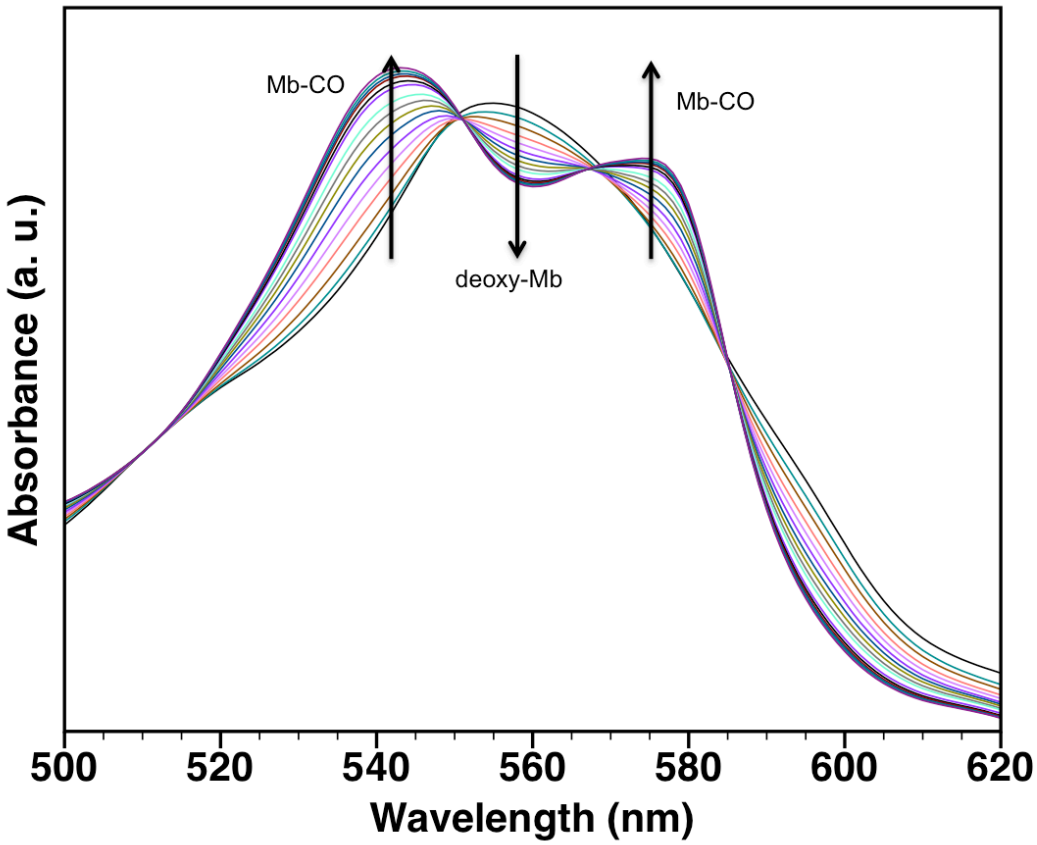

Figure S10. Myoglobin essay performed on **CORF-1_big_60**. Change of the adsorption of Q-band region of myoglobin with increased irradiation time at 460 nm for a suspension containing 100 μg of **CORF-1_big_60** in PBS buffer (pH = 7.4) in the presence of myoglobin (60 μM). Each spectra is taken after 30 s of irradiation

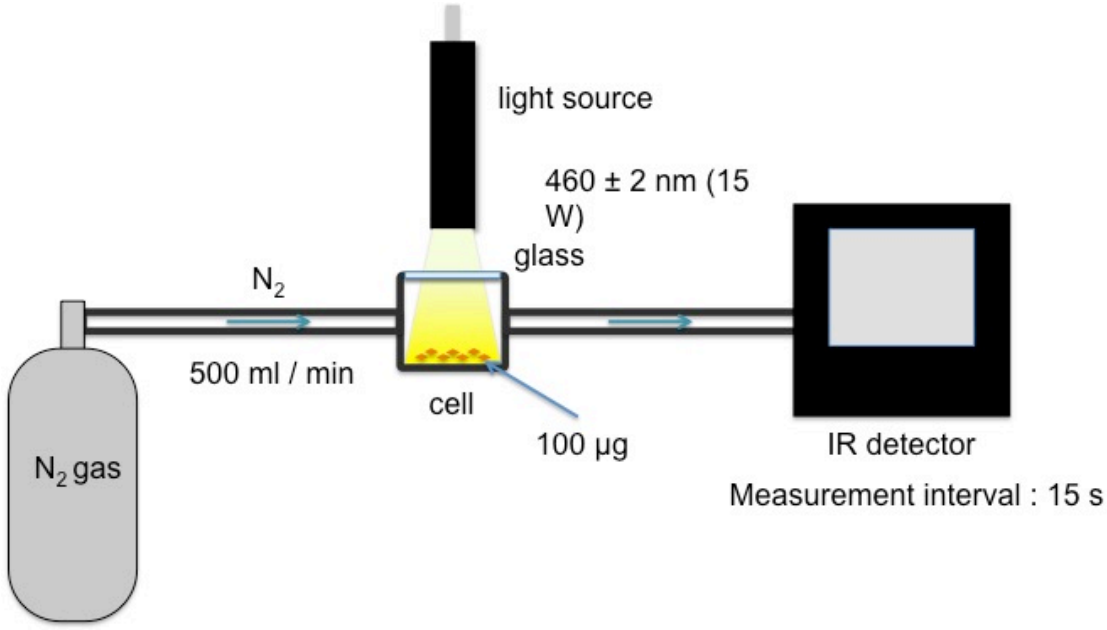

Figure S11. Customized in line CO detection system.

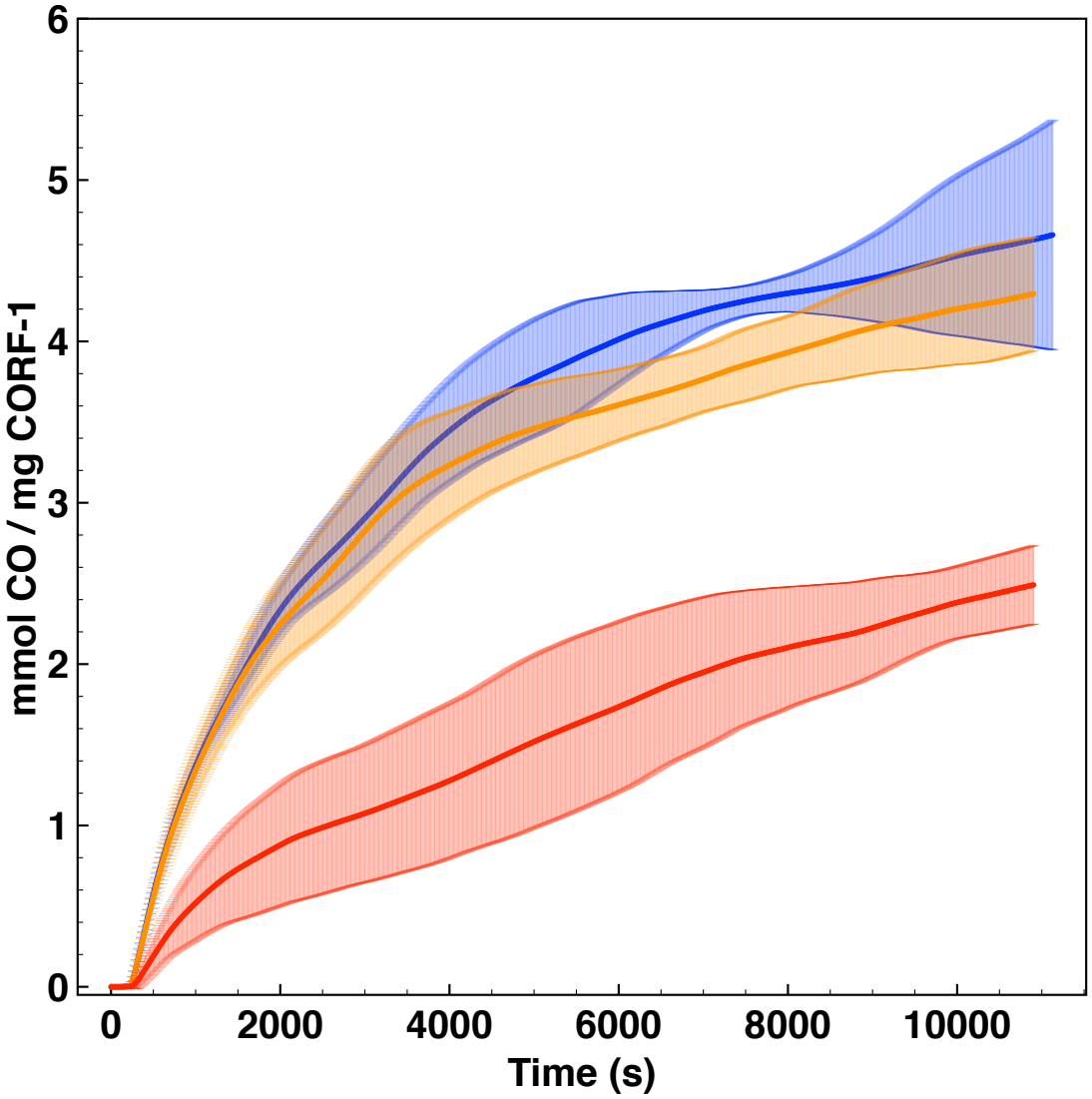

Figure S12. Time dependent amount of CO released to the gas phase per gram of **CORF-1_big_60** (red), **CORF-1_small_79** (blue), **CORF-1_small_95** (orange)**.**

Table S3. Performance of relevant photoCORMAs

Scaffold	CO loading (mmol/g)	λ of CO release (nm)	CO release (mmol/g)	ref
Nanodimond	0.1	365	-	2
SiO_2 nanoparticle	0.273	365	0.18-0.27	3
Metallodendrimer	12.47-17.84	410	7.85 – 11.76	4
Protein cage	-	456	-	5
Mesoporous silica	1.13	Broad visible lght	-	6
Polymeric fibers	26.94	365	3.1-3.7	7
CORF-1_Small_79	4.70		4.66	This work

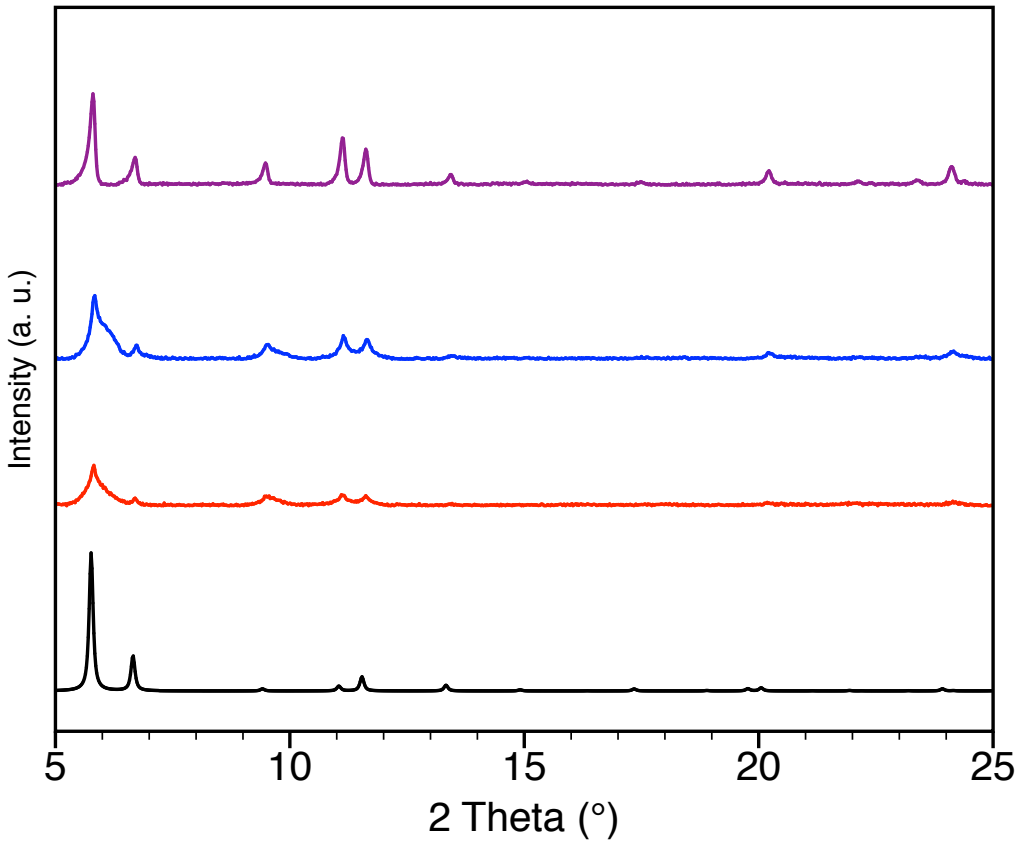

Figure S13. Simulated PXRD of UiO-67 and experimental **CORF-1_big_60** (purple), **CORF-1_small_79** (blue), **CORF-1_small_95** (red) after photo releasing experiments.

References.

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