Supplementary Materials

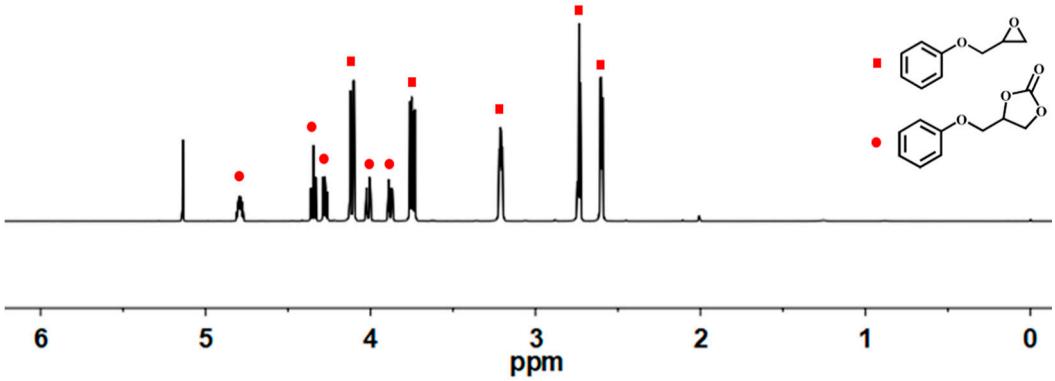
Two Co(II)-based MOFs Constructed from Resorcin [4] Arene Ligand: Syntheses, Structures and Heterogeneous Catalyst for Conversion of CO_2

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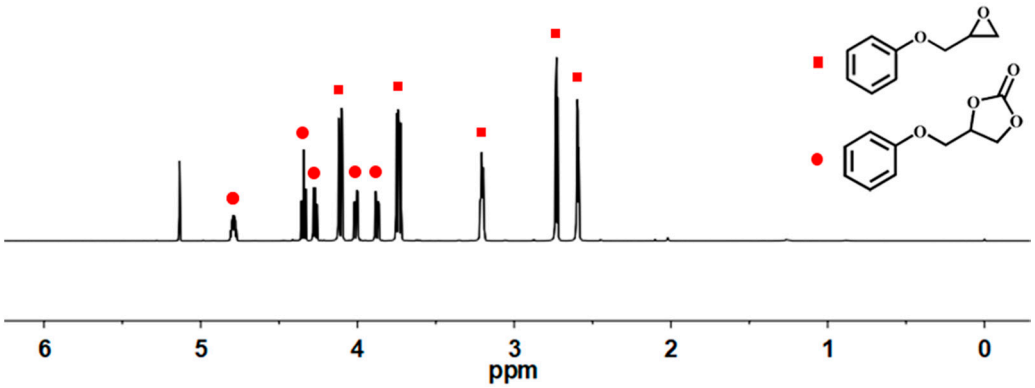
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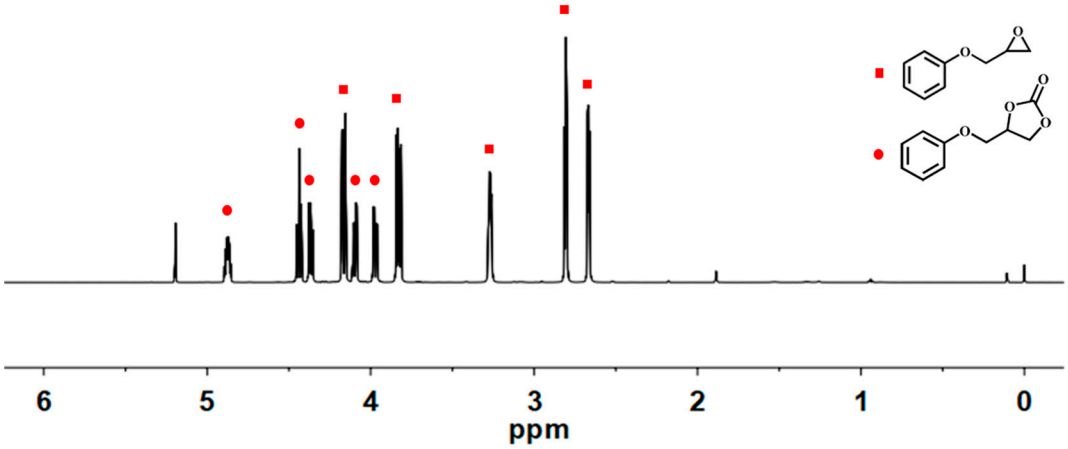
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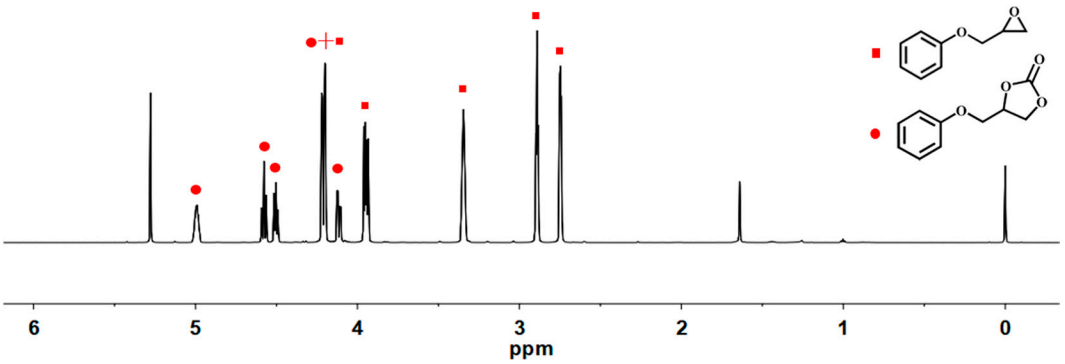
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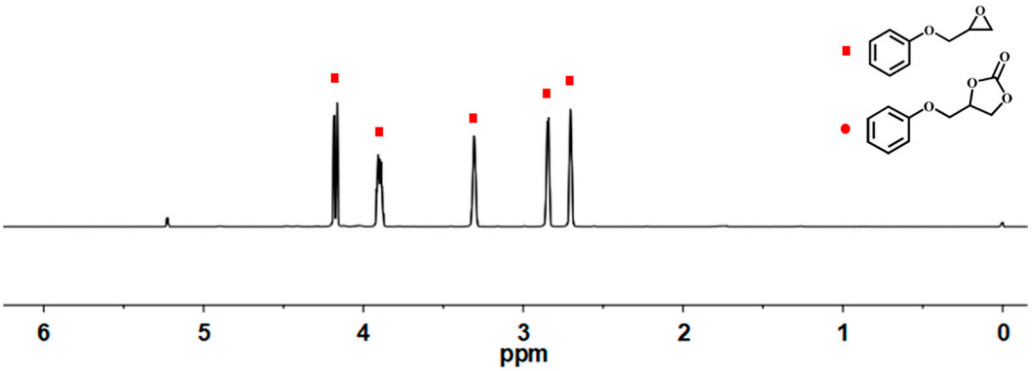
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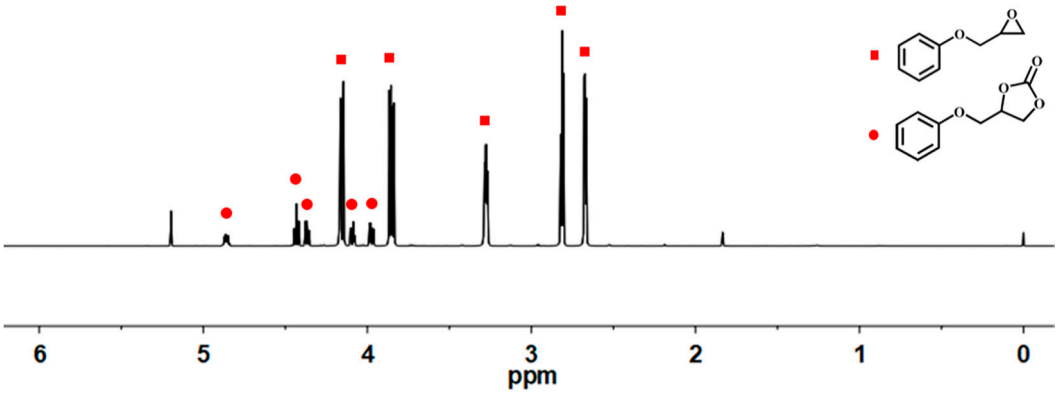
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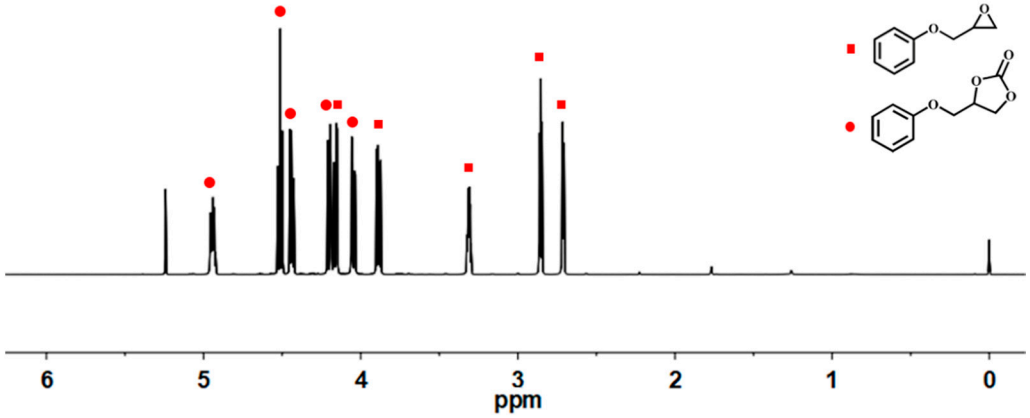
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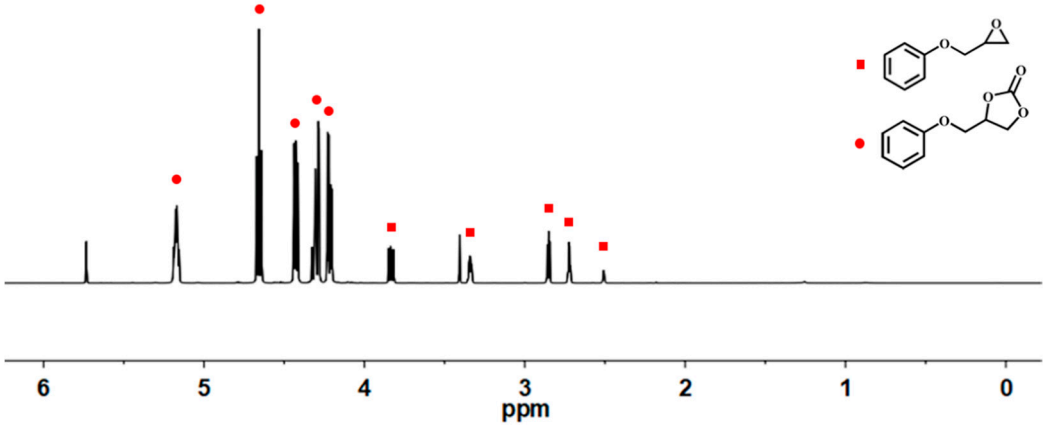
(e)



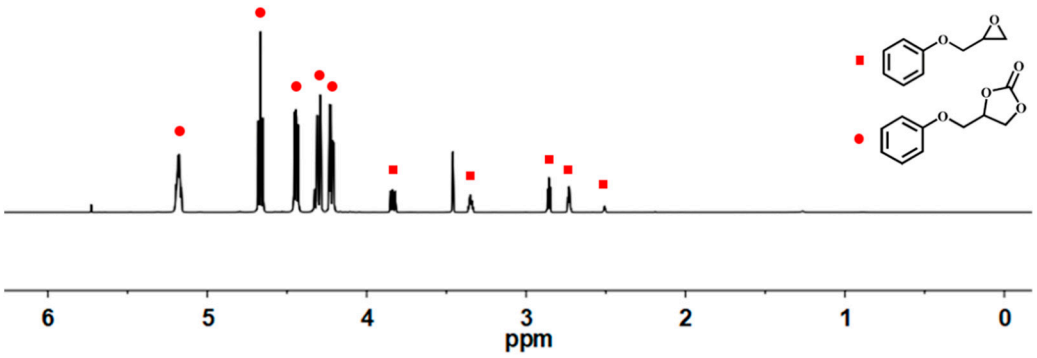
(f)



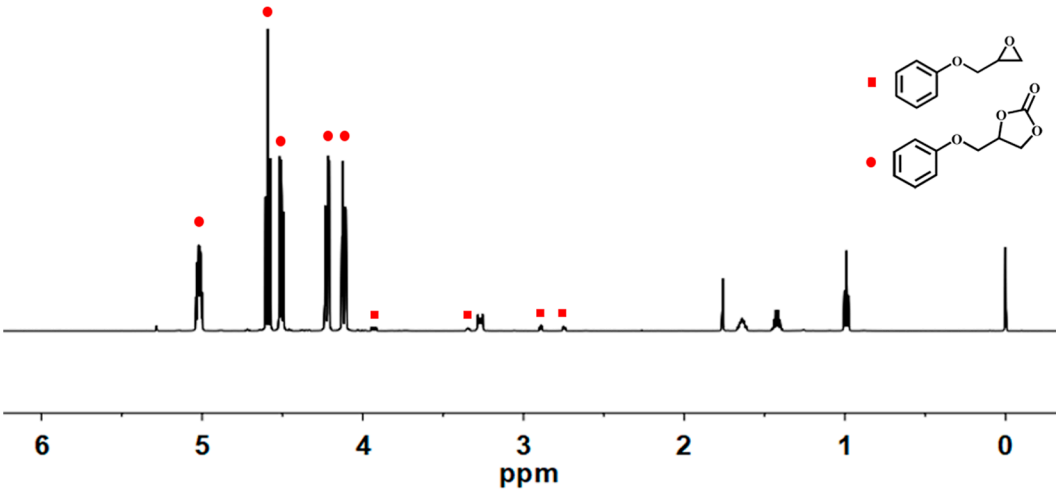
(g)



(h)

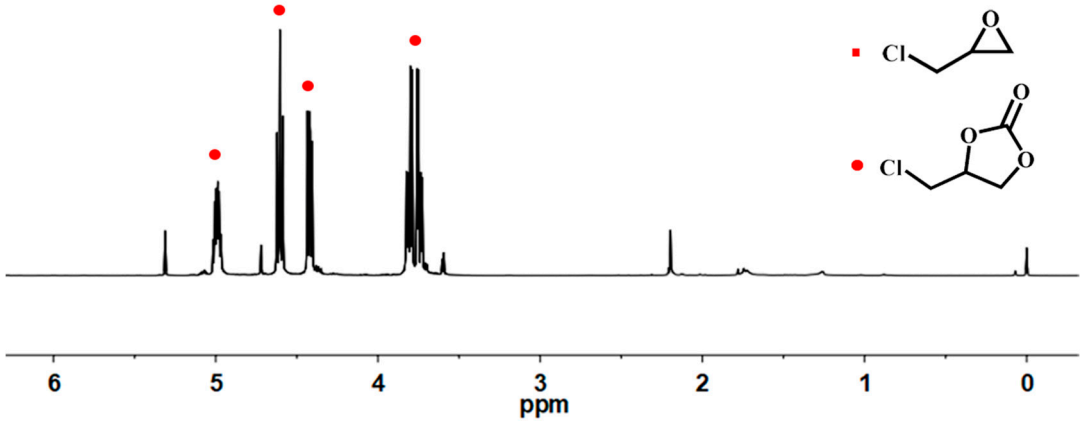


(i)

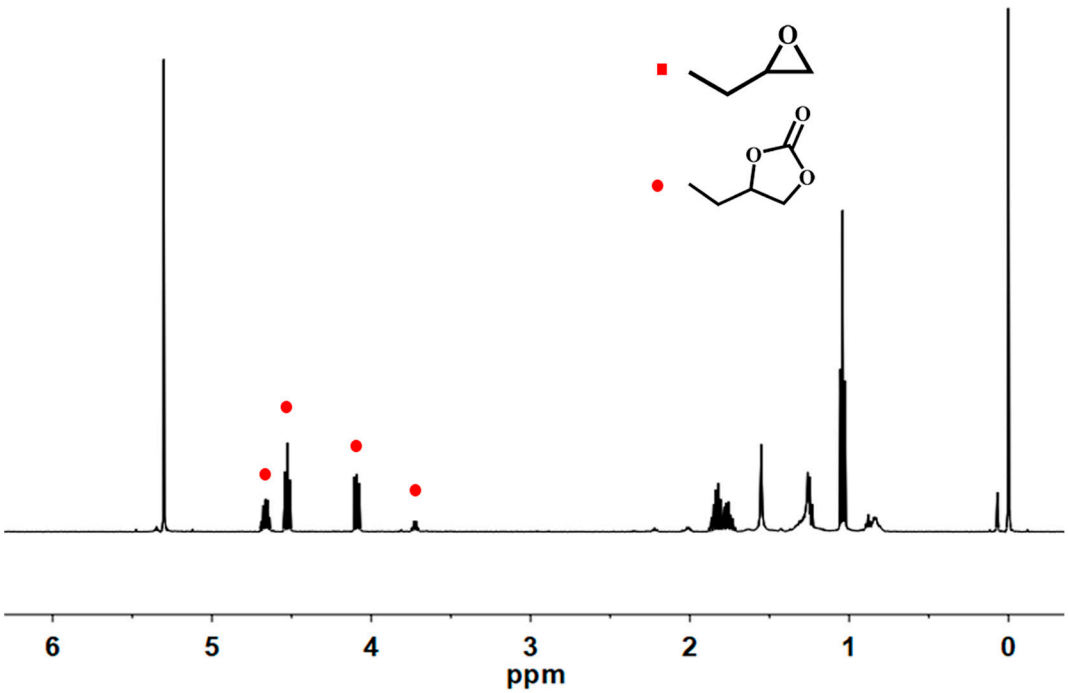


(j)

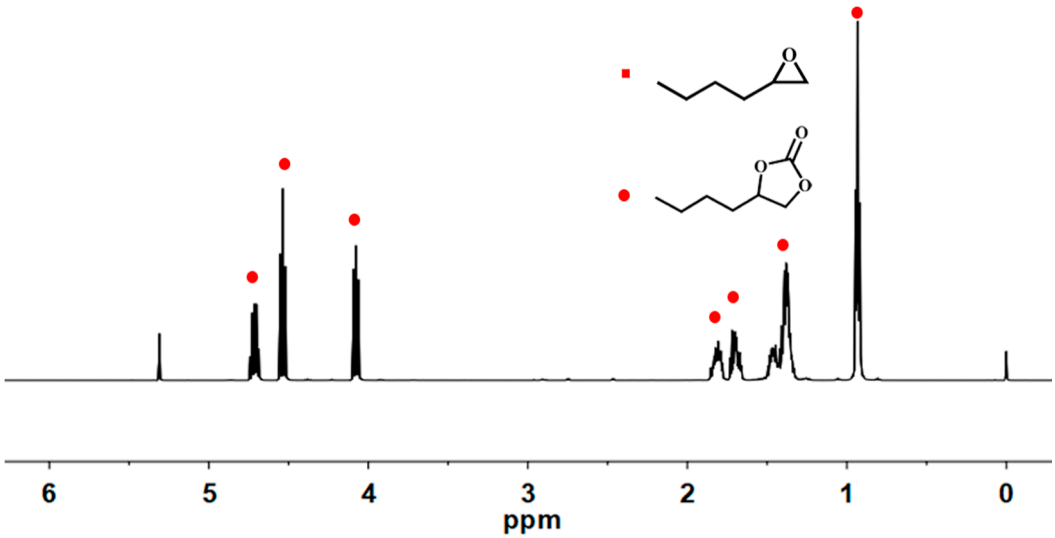
Figure S1. ^{1}H NMR spectrum of the cycloaddtion reaction between CO_2 and gylcidylphenylether. (a) **1** (10 mg) as catalyst for 1 hour at 80 °C. (b) **1** (20 mg) as catalyst for 1 hour at 80 °C. (c) **1** (30 mg) as catalyst for 1 hour at 80 °C. (d) **1** (0 mg) for 1 hour at 80 °C. (e) **1** (30 mg) as catalyst for 1 hour at 25 °C. (f) **1** (30 mg) as catalyst for 1 hour at 50 °C. (g) **1** (30 mg) as catalyst for 2 hours at 80 °C. (h) **1** (30 mg) as catalyst for 4 hours at 80 °C. (i) **1** (30 mg) as catalyst for 6 hours at 80 °C. (j) **1** (30 mg) as catalyst for 8 hours at 80 °C. The catalytic products were extracted by CH_2Cl_2; some of the ^{1}H NMR spectra contain peaks of CH_2Cl_2 at 5.30 ppm and H_2O at 1.56 ppm. Some of the ^{1}H NMR spectra contain peaks of the residual *n*-Bu_4NBr at 0.96, 1.33, 1.73 and 3.24 ppm.



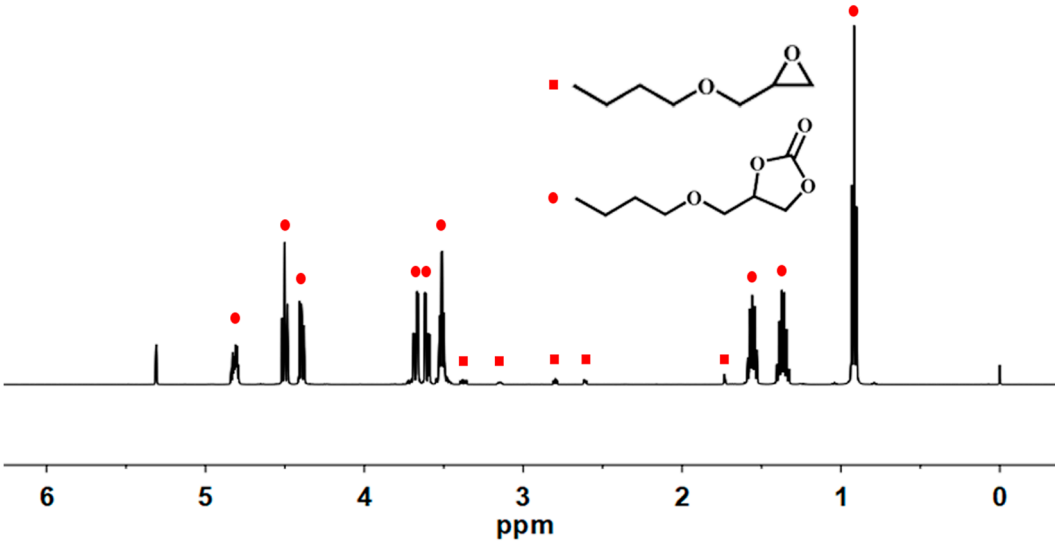
(a)



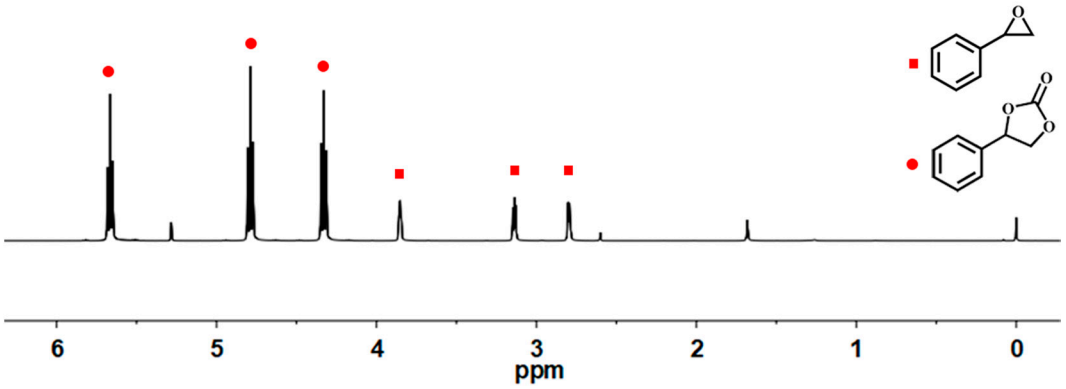
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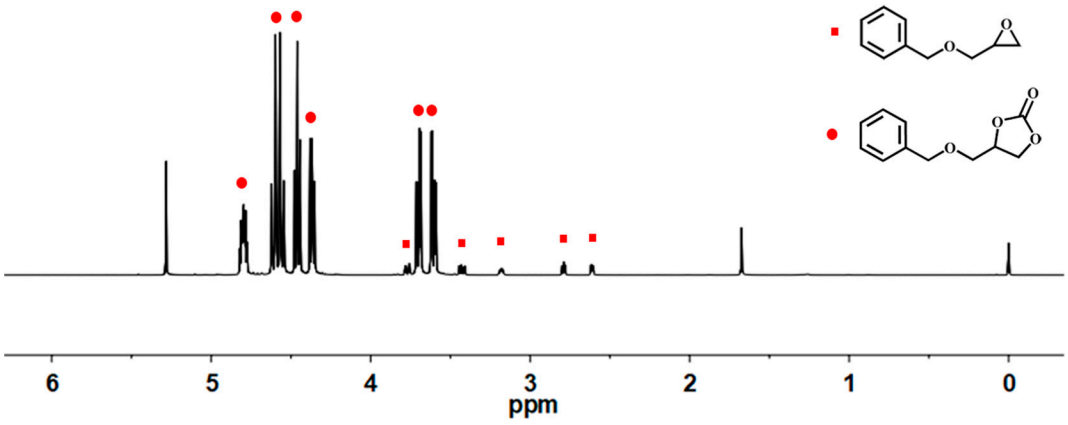
(c)



(d)



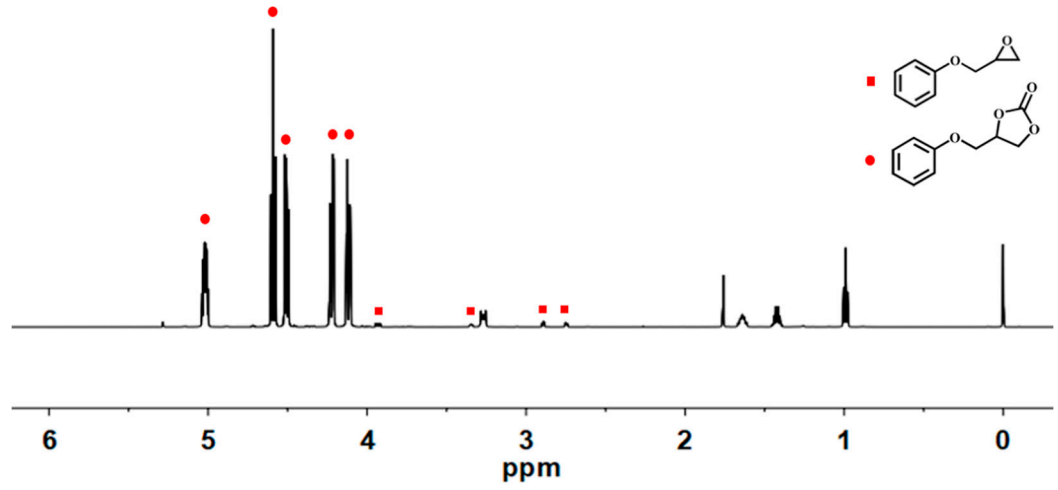
(e)



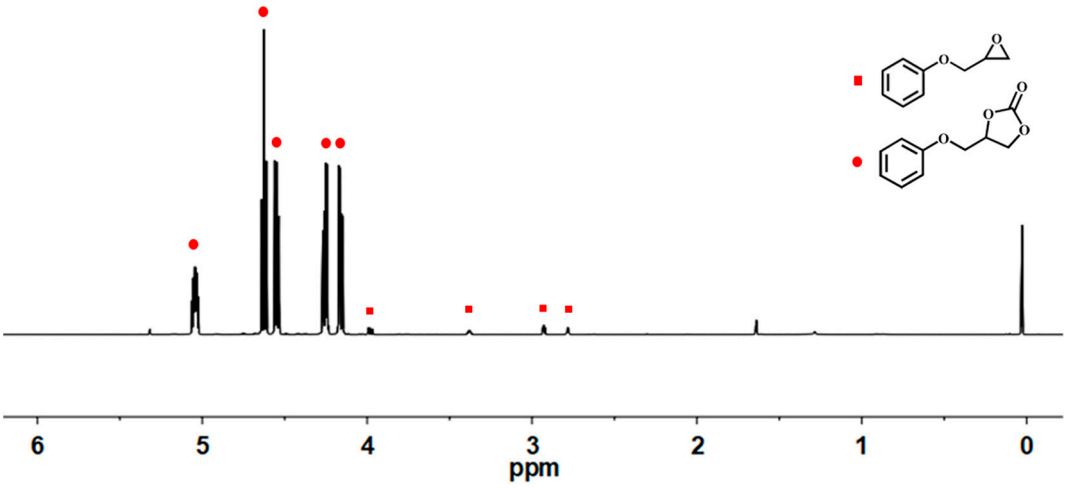
(f)

Figure S2. ^{1}H NMR spectrum of CO_2 coupling with different epoxides using **1**

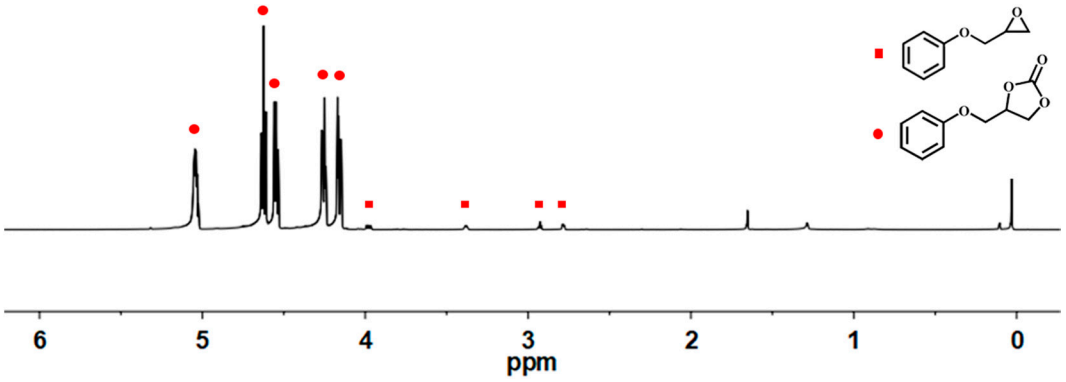
as catalysts. The substrates include (a) epichlorohydrin (TOF = 8.84 h^{-1}), (b) 2-ethyloxirane (TOF = 8.84 h^{-1}), (c) 2-butyloxirane (TOF = 8.84 h^{-1}), (d) 2-(butoxymethyl)oxirane (TOF = 8.48 h^{-1}), (e) 1,2-epoxyethylbenzene (TOF = 6.70 h^{-1}) and (f) benzylglycidylether (TOF = 8.48 h^{-1}). The catalytic products were extracted by CH_2Cl_2; some of the ^1H NMR spectra contain peaks of CH_2Cl_2 at 5.30 ppm and H_2O at 1.56 ppm. Some of the ^1H NMR spectra contain peaks of the residual *n*-Bu_4NBr at 0.96, 1.33, 1.73 and 3.24 ppm.



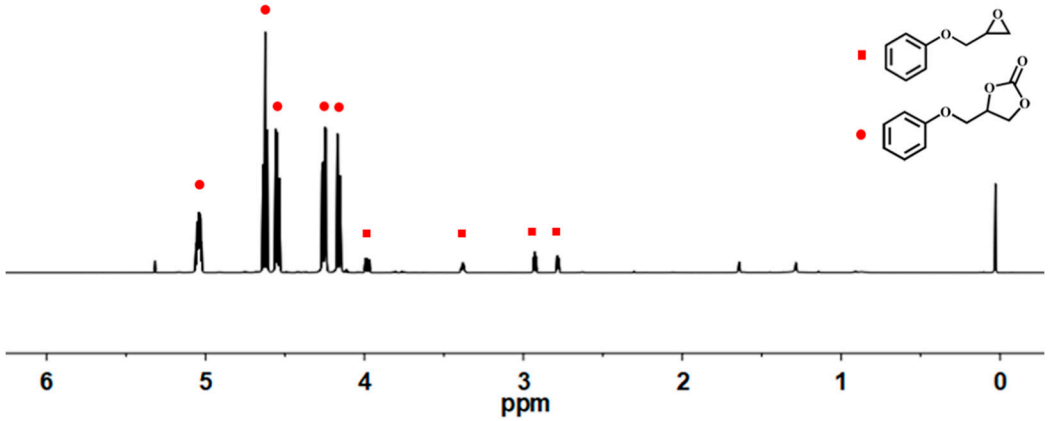
(a)



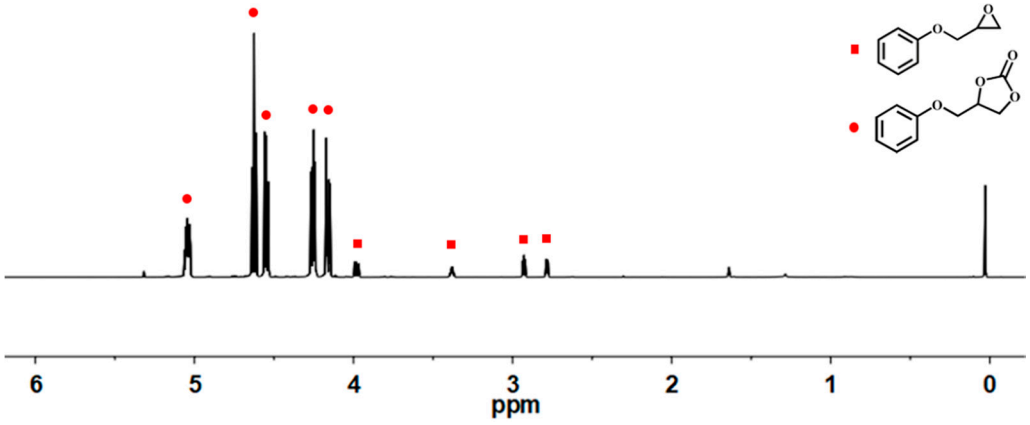
(b)



(c)



(d)



(e)

Figure S3. ^{1}H NMR spectrum of the cycloaddtion reaction between CO_2 and gylcidylphenylether in different circles. (a) In the first circle. (b) In the second circle. (c) In the third circle. (d) In the fourth circle. (e) In the fifth circle. The

catalytic products were extracted by CH_2Cl_2; some of the ^1H NMR spectra contain peaks of CH_2Cl_2 at 5.30 ppm and H_2O at 1.56 ppm. Some of the ^1H NMR spectra contain peaks of the residual *n*-Bu_4NBr at 0.96, 1.33, 1.73 and 3.24 ppm.

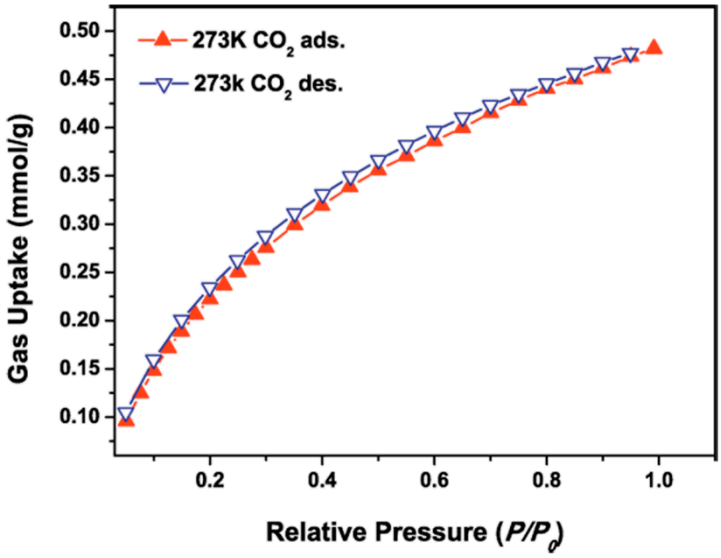


Figure S4. CO_2 total adsorption isotherm for **1**.

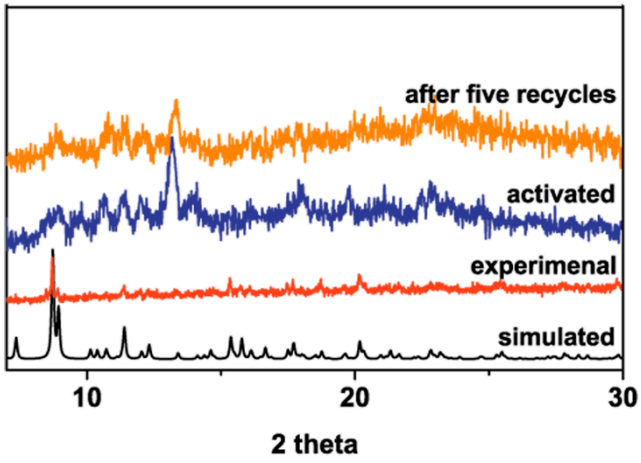


Figure S5. PXRD patterns of the simulated (black), the experimental (red), the activated (blue), and after five recycles (yellow) of the CO_2 conversion reaction catalyzed by **1**.

Table S1. Selected bond distances (Å) and angles (deg) for **1**.

Co(1)-O(18)	2.079(3)	Co(1)-O(18)$^{\#1}$	2.079(3)
Co(1)-O(2W)$^{\#1}$	2.096(5)	Co(1)-O(2W)	2.096(5)
Co(1)-O(1W)$^{\#1}$	2.129(4)	Co(1)-O(1W)	2.130(4)
Co(2)-O(17)$^{\#2}$	1.993(4)	Co(2)-O(9)$^{\#3}$	2.044(4)
Co(2)-O(14)$^{\#4}$	2.079(4)	Co(2)-O(12)	2.191(5)
Co(2)-O(11)	2.209(5)	Co(3)-O(3W)	2.072(5)
Co(3)-O(15)	2.078(4)	Co(3)-O(4W)	2.098(4)
Co(3)-O(2)$^{\#5}$	2.108(4)	Co(3)-O(6)$^{\#6}$	2.113(4)
Co(3)-O(2)$^{\#7}$	2.188(4)	O(2)-Co(3)$^{\#4}$	2.108(4)
O(2)-Co(3)$^{\#7}$	2.188(4)	O(6)-Co(3)$^{\#6}$	2.113(4)
O(9)-Co(2)$^{\#3}$	2.044(4)	O(14)-Co(2)$^{\#5}$	2.079(4)
O(17)-Co(2)$^{\#2}$	1.993(4)	O(18)-Co(1)-O(18)$^{\#1}$	180.0
O(18)-Co(1)-O(2W)$^{\#1}$	90.32(17)	O(18)$^{\#1}$-Co(1)-O(2W)$^{\#1}$	89.68(17)
O(18)-Co(1)-O(2W)	89.68(17)	O(18)$^{\#1}$-Co(1)-O(2W)	90.32(17)
O(2W)$^{\#1}$-Co(1)-O(2W)	180.00(12)	O(18)-Co(1)-O(1W)$^{\#1}$	93.16(16)
O(18)$^{\#1}$-Co(1)-O(1W)$^{\#1}$	86.84(15)	O(2W)$^{\#1}$-Co(1)-O(1W)$^{\#1}$	89.1(2)
O(2W)-Co(1)-	90.9(2)	O(18)-Co(1)-O(1W)	86.84(16)

O(1W)#1			
O(18)#1-Co(1)-O(1W)	93.16(15)	O(2W)#1-Co(1)-O(1W)	90.9(2)
O(2W)-Co(1)-O(1W)	89.1(2)	O(1W)#1-Co(1)-O(1W)	180.0
O(17)#2-Co(2)-O(9)#3	105.42(18)	O(17)#2-Co(2)-O(14)#4	91.92(16)
O(9)#3-Co(2)-O(14)#4	103.61(16)	O(17)#2-Co(2)-O(12)	91.94(19)
O(9)#3-Co(2)-O(12)	154.88(19)	O(14)#4-Co(2)-O(12)	93.6(2)
O(17)#2-Co(2)-O(11)	148.5(2)	O(9)#3-Co(2)-O(11)	100.32(19)
O(14)#4-Co(2)-O(11)	99.51(18)	O(12)-Co(2)-O(11)	58.27(19)
O(3W)-Co(3)-O(15)	90.8(2)	O(3W)-Co(3)-O(4W)	92.00(19)
O(15)-Co(3)-O(4W)	176.5(2)	O(3W)-Co(3)-O(2)#5	170.21(19)
O(15)-Co(3)-O(2)#5	87.23(19)	O(4W)-Co(3)-O(2)#5	90.37(17)
O(3W)-Co(3)-	87.51(19)	O(15)-Co(3)-O(6)#6	88.30(18)

O(6)$^{\#6}$			
O(4W)-Co(3)-O(6)$^{\#6}$	89.74(16)	O(2)$^{\#5}$-Co(3)-O(6)$^{\#6}$	102.01(17)
O(3W)-Co(3)-O(2)$^{\#7}$	90.26(19)	O(15)-Co(3)-O(2)$^{\#7}$	95.62(18)
O(4W)-Co(3)-O(2)$^{\#7}$	86.45(16)	O(2)$^{\#5}$-Co(3)-O(2)$^{\#7}$	80.40(17)
O(6)$^{\#6}$-Co(3)-O(2)$^{\#7}$	175.52(15)	Co(3)$^{\#4}$-O(2)-Co(3)$^{\#7}$	99.60(17)

Symmetry transformations used to generate equivalent atoms: $^{\#1}$ -x-2,-y+2,-z-1, $^{\#2}$ -x-1,-y+1,-z, $^{\#3}$ -x,-y+1,-z, $^{\#4}$ x+1,y,z, $^{\#5}$ x-1,y,z, $^{\#6}$ -x-1,-y+2,-z, $^{\#7}$ -x-1,-y+1,-z+1.

Table S2. Selected bond distances (Å) and angles (deg) for **2**.

Co(1)-O(8)$^{\#1}$	2.055(3)	Co(1)-O(6)$^{\#2}$	2.074(3)
Co(1)-O(1W)	2.110(3)	Co(1)-O(18)$^{\#3}$	2.118(3)
Co(1)-O(11)$^{\#4}$	2.128(3)	Co(1)-O(1)	2.164(3)
Co(2)-O(19)	2.035(4)	Co(2)-O(17)$^{\#5}$	2.061(3)
Co(2)-O(5)	2.064(3)	Co(2)-O(11)$^{\#1}$	2.065(3)
Co(2)-O(4W)	2.093(4)	Co(2)-O(10)$^{\#1}$	2.153(3)
Co(3)-O(9)$^{\#1}$	2.019(3)	Co(3)-O(2W)	2.068(3)
Co(3)-O(14)$^{\#1}$	2.086(3)	Co(3)-O(3W)	2.102(4)
Co(3)-O(1)	2.145(3)	Co(3)-O(18)$^{\#3}$	2.180(3)
O(6)-Co(1)$^{\#7}$	2.074(3)	O(8)-Co(1)$^{\#1}$	2.055(3)

O(9)-Co(3)#1	2.019(3)	O(10)-Co(2)#1	2.153(3)
O(11)-Co(2)#1	2.065(3)	O(11)-Co(1)#4	2.128(3)
O(14)-Co(3)#1	2.086(3)	O(17)-Co(2)#8	2.061(3)
O(18)-Co(1)#9	2.118(3)	O(18)-Co(3)#9	2.180(3)
O(8)#1-Co(1)-O(6)#2	176.39(14)	O(8)#1-Co(1)-O(1W)	90.83(14)
O(6)#2-Co(1)-O(1W)	86.03(14)	O(8)#1-Co(1)-O(18)#3	92.38(13)
O(6)#2-Co(1)-O(18)#3	91.08(13)	O(1W)-Co(1)-O(18)#3	166.68(11)
O(8)#1-Co(1)-O(11)#4	88.97(12)	O(6)#2-Co(1)-O(11)#4	89.42(11)
O(1W)-Co(1)-O(11)#4	93.15(12)	O(18)#3-Co(1)-O(11)#4	99.82(11)
O(8)#1-Co(1)-O(1)	88.17(12)	O(6)#2-Co(1)-O(1)	93.59(12)
O(1W)-Co(1)-O(1)	89.81(12)	O(18)#3-Co(1)-O(1)	77.38(11)
O(11)#4-Co(1)-O(1)	175.92(13)	O(19)-Co(2)-O(17)#5	89.82(16)
O(19)-Co(2)-O(5)	89.51(19)	O(17)#5-Co(2)-O(5)	94.25(14)
O(19)-Co(2)-	169.17(17)	O(17)#5-Co(2)-	100.88(12)

O(11)$^{\#1}$		O(11)$^{\#1}$	
O(5)-Co(2)-O(11)$^{\#1}$	88.06(13)	O(19)-Co(2)-O(4W)	90.9(2)
O(17)$^{\#5}$-Co(2)-O(4W)	87.66(17)	O(5)-Co(2)-O(4W)	178.04(17)
O(11)$^{\#1}$-Co(2)-O(4W)	91.17(16)	O(19)-Co(2)-O(10)$^{\#1}$	92.41(16)
O(17)$^{\#5}$-Co(2)-O(10)$^{\#1}$	174.45(15)	O(5)-Co(2)-O(10)$^{\#1}$	90.86(14)
O(11)$^{\#1}$-Co(2)-O(10)$^{\#1}$	77.09(11)	O(4W)-Co(2)-O(10)$^{\#1}$	87.21(16)
O(9)$^{\#1}$-Co(3)-O(2W)	170.22(14)	O(9)$^{\#1}$-Co(3)-O(14)$^{\#1}$	82.67(15)
O(2W)-Co(3)-O(14)$^{\#1}$	89.19(16)	O(9)$^{\#1}$-Co(3)-O(3W)	88.93(18)
O(2W)-Co(3)-O(3W)	95.82(19)	O(14)$^{\#1}$-Co(3)-O(3W)	85.21(16)
O(9)$^{\#1}$-Co(3)-O(1)	88.27(14)	O(2W)-Co(3)-O(1)	88.97(16)
O(14)$^{\#1}$-Co(3)-O(1)	107.19(13)	O(3W)-Co(3)-O(1)	166.81(13)
O(9)$^{\#1}$-Co(3)-	95.08(12)	O(2W)-Co(3)-	93.39(13)

O(18)#3		O(18)#3	
O(14)#1-Co(3)-O(18)#3	175.57(14)	O(3W)-Co(3)-O(18)#3	90.94(13)
O(1)-Co(3)-O(18)#3	76.48(11)	Co(1)#9-O(18)-Co(3)#9	97.97(11)

Symmetry transformations used to generate equivalent atoms: #1 -x+1,-y+1,-z-1, #2 x-1,y,z+1, #3 x-1,y-1,z+1, #4 -x,-y+1,-z, #5 x,y-1,z, #7 x+1,y,z-1, #8 x,y+1,z, #9 x+1,y+1,z-1.