Electronic Supplementary Information

MOF-derived transition metal-based catalyst for the electrochemical reduction of CO_2 to CO: A mini review

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Table S1 Molecular formula for MOF precursors in the MOF-derived materials.

MOF	Molecular formula	Ref.
ZIF-8	$Zn(C_4H_5N_2)_2$	[1-12]
ZIF-67	$CoC_4H_6N_2$	[1]
PCN-222/MOF-545	$Zr_6C_{96}H_{64}Cl_2Fe_2N_8O_{32}$	[13-15]
PCN-224	$Zr_{15}C_{144}H_{72}N_{12}O_{64}$	[13]
MOF-74	$Zn_2C_8H_4O_8$	[16, 17]
Fe-BTT	$Fe_3[(Fe_4Cl)_3(BTT)_8(MeOH)_4]_2$	[18]
Cu-BTT	$[Cu(DMF)_6][(Cu_4Cl)_3(BTT)_8(H_2O)_{12}]$	[19, 20]
HKUST-1/Cu-BTC	$Cu_3(C_9H_3O_6)_2$	[21]

Table S2. The performance of MOF catalysts for the electrochemical reduction of CO_2 to CO.

Metal center	MOF	Electrolyte	Potential	Main product	Max FE/%	Catalytic stability/h	Ref.
Co	$CoCp_2$@MOF-545-Co	0.5 M $KHCO_3$	-0.7 V vs. RHE	CO	97.0	/	[22]
Co	CoPc–Cu–O	0.2 M $KHCO_3$	-0.74 V vs. RHE	CO	85.0	10	[23]
Co	MOF-1992	0.1 M $KHCO_3$	-0.63 V vs. RHE	CO	78.0	2	[24]
Co	PPy@MOF-545-Co	0.1 M $KHCO_3$	-0.8 V vs. RHE	CO	98.0	10	[25]
Co	$Al_2(OH)_2$TCPP-Co	0.5 M $KHCO_3$	-0.7 V vs. RHE	CO	76.0	7	[26]
Zn	ZIF-A-LD	0.1 M $KHCO_3$	-1.1 V vs. RHE	CO	90.6	10	[27]
Zn	ZIF-8	0.25 M K_2SO_4	-1.1 V vs. RHE	CO	81.0	/	[28]
Zn	ZIF-8	0.5 M NaCl	-1.8 V vs. SCE	CO	65.0	4	[29]
Zn	PcCu–O_8–Zn	0.1 M $KHCO_3$	-0.7 V vs. RHE	CO	88.0	11	[30]
Ni	$Ni(Im)_2$ ZIF	0.5 M $KHCO_3$	-0.85 V vs. RHE	CO	78.8	14	[31]
Ni	NiPc–$Ni(NH)_4$	0.5 M $KHCO_3$	-0.7 V vs. RHE	CO	96.4	10	[32]
Ni	NiPc–NiO_4	0.5 M $KHCO_3$	-0.85 V vs. RHE	CO	98.4	10	[33]
Fe	PCN-222(Fe)/C	0.5 M $KHCO_3$	-1.35 V vs. SCE	CO	91.0	10	[34]
	PCN-223-BA				76.8		
Zr	PCN-223-FA	0.5 M $KHCO_3$	-0.77 V vs. RHE	CO	81.0	20	[35]
	PCN-223-AA				90.7		

Table S3. The performance of MOF-derived catalysts for the electrochemical reduction of CO_2 to CO.

Catalyst	MOF precursor	Electrolyte	Potential	Main product	Max FE/%	Catalytic stability/h	Ref.
$Fe_1N_2O_2$/NC	Fe/Zn-MOF 74	0.1 M $KHCO_3$	-0.5 V vs. RHE	CO	99.7	12	[16]
$Zn_{0.5}Fe_{0.5}$–N–C-222	MOF PCN-222	0.1 M $KHCO_3$	-1.3 V vs. Ag/AgCl	CO	96.0	12	[13]
$Zn_{0.5}Fe_{0.5}$–N–C-224	MOF PCN-224		-1.2 V vs. Ag/AgCl		92.0		
FeSAs/CNF-900	ZnFe-ZIF	0.5 M $KHCO_3$	-0.47 V vs. RHE	CO	86.9	12	[2]
Fe-N_4	Fe-ZIF	0.1 M $KHCO_3$	-0.58 V vs. RHE	CO	93.0	20	[3]
Ni_1-N-C	Ni-PCN-222	0.5 M $KHCO_3$	-0.8 V vs. RHE	CO	96.8	10	[14]
C-Zn_1Ni_4 ZIF-8	ZnNi-ZIF-8	0.5 M $KHCO_3$	-0.73 V vs. RHE	CO	98.0	12	[5]
Ni_{SA}-N_2-C	MgNi-MOF-74	0.5 M $KHCO_3$	-0.8 V vs. RHE	CO	98.0	10	[17]
Ni-N_4-O/C	Mn,Ni-MOFs	0.5 M $KHCO_3$	-0.9 V vs. RHE	CO	100.0	20	[36]
Cu-In-NC	CuIn-ZIF-8	0.1 M $KHCO_3$	-0.7 V vs. RHE	CO	96.0	12	[10]
NiNPIC-4	Zn-Ni MOFs	0.5 M $KHCO_3$	-0.65 V vs. RHE	CO	95.1	24	[37]
Fe–N–C_{900}	Fe-BTT	0.1 M $KHCO_3$	-1.2 V vs. Ag/AgCl	CO	86.8	10	[18]
PCN-222(Fe)/C	PCN-222(Fe)	0.5 M $KHCO_3$	-0.6 V vs. RHE	CO	91.0	10	[34]
PCN-222(Fe)/CNTs	PCN-222(Fe)	0.5 M $KHCO_3$	-0.6 V vs. RHE	CO	95.5	10	[38]
PCN-222(Mn)/CNT	PCN-222(Mn)		-0.6 V vs. RHE		88.5		
PCN-222(Co)/CNT	PCN-222(Co)	0.5 M $KHCO_3$	-0.65 V vs. RHE	CO	89.3	20	[39]
PCN-222(Zn)/CNT	PCN-222(Zn)		-0.7 V vs. RHE		92.5		

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