Study of electrocatalytic CO_2 reduction using tin-oxalate organometallic frameworks doped with cadmium

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1 Diffraction Data

Table S1. DRX indexed peaks and crystallographic data of CdOx MOF compound.

°2θ	Peak height	FWHM	H	k	l	d Å	Chemical Form. $Cd(C_2O_4)_{0.8}$
14.68	1000	0.1011	0	1	0	6.0358	Space group:
15.42	249.1	0.1011	1	0	1	5.7459	P m n a (53)
17.54	292.5	0.1213	0	1	1	5.0567	
19.17	58.4	0.1011	0	0	2	4.6289	Crystal system: Orthorhombic
21.38	25	0.101	1	1	1	4.1561	
24.27	343.8	0.1213	0	1	2	3.6669	Cell parameters:
27.14	36.8	0.1415	1	1	2	3.2852	
28.48	32.1	0.1213	2	1	0	3.1341	a= 7.3309 Å
29.58	135.2	0.1011	0	2	0	3.0199	
30.1	51.2	0.1415	2	1	1	2.9688	b= 6.0368 Å
31.14	259.1	0.1213	2	0	2	2.8718	c= 9.2578 Å
31.43	240.9	0.0809	1	0	3	2.846	
31.53	117.5	0.0809	1	0	3	2.8377	$\alpha = \beta = \gamma = 90^o$
32.57	11.8	0.1011	0	1	3	2.7494	
34.55	59.6	0.1213	2	1	2	2.596	
34.85	109.2	0.1011	1	1	3	2.5746	
35.48	12.3	0.1011	0	2	2	2.5299	
37.61	67.5	0.1415	1	2	2	2.3916	
37.72	46.4	0.1415	1	1	2	2.3851	
38.06	73.8	0.1011	3	0	1	2.3643	

Table S1. DRX indexed peaks and crystallographic data of CdOx MOF compound (cont.)

º2θ	Peak height	FWHM	H	k	l	d Å	Chemical Form. $Cd(C_2O_4)_{0.8}$
39.98	46	0.1415	2	2	1	2.2551	
41.01	37.9	0.1213	3	1	1	2.201	
41.77	8	0.1011	0	1	4	2.1626	
43.47	19.3	0.182	2	2	2	2.0819	
43.66	91.3	0.1618	1	1	4	2.0734	
44.5	10.9	0.1213	3	1	2	2.036	
46.25	44.7	0.1213	0	3	1	1.9629	
47.42	55.4	0.1011	3	0	3	1.9173	
47.54	28.6	0.1011	3	0	3	1.9126	
49.71	24.3	0.1213	0	2	4	1.8342	
49.9	40.2	0.1415	3	1	3	1.8278	
50.03	21.5	0.1415	3	1	3	1.8233	
50.82	39.2	0.1011	1	0	5	1.7967	
50.98	50.9	0.1618	1	0	5	1.7915	
51.23	50.5	0.182	1	3	2	1.7831	
51.37	27.7	0.1415	1	2	4	1.7789	
52.01	26.4	0.182	2	3	0	1.7583	
52.12	22	0.1618	3	2	2	1.7548	
52.79	33.9	0.1415	4	1	0	1.734	
52.92	22.9	0.2224	2	3	1	1.7301	
53.18	36.2	0.1213	4	1	1	1.7223	
53.32	18.1	0.1213	4	1	1	1.7182	
53.74	10.5	0.1011	4	0	2	1.7057	
56.02	11.1	0.1415	2	2	4	1.6415	
56.84	22.7	0.1618	3	1	4	1.6199	
59.88	22.2	0.2224	0	0	6	1.5448	
62.02	9.8	0.1213	0	1	6	1.4964	
62.4	35.4	0.2831	0	4	1	1.4881	
62.55	21.9	0.1618	1	3	4	1.485	
62.91	13.9	0.1415	3	0	5	1.4773	
63.27	21.2	0.182	3	3	2	1.4699	
65.57	10.2	0.1011	2	0	6	1.4236	
67.61	11.6	0.1213	2	1	6	1.3857	

Table S2. DRX indexed peaks and crystallographic data of SnOxal MOF.

°2θ	Peak height	FWHM	h	k	l	d	Chemical Formula: $Sn(C_2O_4)_{0.45}(DMF)_{1.51}$
19.24	445.9	0.1011	1	1	0		Space group C 1 2/c 1 (15)
19.64	240.6	0.1213	1	1	-1		Crystal system: Monoclinic
20.96	108.6	0.1415	2	0	0		Cell parameters:
22.37	1000	0.1011	2	0	-2		a= 10.3768 Å
26.62	363	0.2426	1	1	1		b= 5.5051 Å
27.45	469.7	0.182	-1	1	2		c= 8.2393 Å
30.91	164.6	0.1011	3	1	-1		$\alpha = \gamma = 90^{o}$; $\beta = 125.092^{o}$
31.7	41.3	0.0607	3	1	-2		
34.7	170.9	0.1011	4	0	-2		
35.25	140.2	0.1415	0	2	1		
35.34	226.1	0.0809	0	2	1		
35.71	56.2	0.1213	3	1	0		
37.02	118.5	0.1618	2	2	-1		
37.68	219.1	0.1618	3	1	-3		
37.79	230	0.0809	3	1	-3		
38.72	74.5	0.0809	-1	1	3		
42.65	35	0.1011	4	0	0		
45.09	54.7	0.0809	-2	0	4		
45.34	60.2	0.182	-2	0	4		
45.47	88.5	0.1213	2	2	1		
46.81	70	0.1011	4	0	-4		
46.95	70	0.1011	-2	2	3		
47.13	50.3	0.1213	5	1	-2		
49.58	20	0.1011	4	2	-2		
51.09	183.3	0.3235	4	2	-3		
51.65	36	0.1011	-1	1	4		
52.62	75.1	0.4044	0	2	3		
54.52	26.6	0.1011	0	0	4		
55.89	27	0.1011	3	1	2		
61.45	39.9	0.1213	3	3	-3		
64.53	77.1	0.0404	6	2	-2		
66.31	40	0.1011	6	0	0		
68.51	25	0.1011	5	3	-2		

Table S3. DRX indexed peaks and crystallographic data of $SnCd_{0.25}Ox$ MOF.

°2θ	Peak height	FWHM	h	k	l	Chemical Formula $SnCd_{0.011}(C_2O_4)_{0.45}(DMF)_{1.23}$
19.22	1000	0.1213	1	1	0	Space group C 1 2/c 1 (15)
19.62	159.3	0.1213	1	1	-1	Crystal system: Monoclinic
20.96	126.8	0.1011	2	0	0	
22.37	258.9	0.1011	2	0	-2	Cell parameters:
26.46	208.6	0.6875	0	0	2	a= 10.348 Å
26.6	309.3	0.2022	1	1	1	b= 5.489 Å
27.47	284.6	0.1618	-1	1	2	c = 8.218 Å
30.94	39	0.1213	3	1	-1	α = γ = 90º; β =125.09 º
31.7	34.3	0.1213	3	1	-2	
34.69	92.1	0.1618	0	2	0	
35.22	142	0.1415	0	2	1	
35.69	67	0.1011	3	1	0	
36.99	143.3	0.1618	2	2	-1	
37.66	100.3	0.182	3	1	-3	
38.72	53.4	0.182	-1	1	3	
42.61	46.1	0.1213	0	0	2	
42.73	33.2	0.2022	4	0	0	
44.4	26.2	0.0809	3	1	1	
45.08	22.4	0.1618	-2	0	4	
45.31	59.9	0.1213	2	2	1	
46.97	49.4	0.182	-2	2	3	
47.83	35	0.121	5	1	-3	
49.59	30	0.1416	4	2	-1	
50.93	111.8	0.2831	1	1	3	
51.05	114.6	0.4044	1	3	0	
51.19	124.8	0.2629	-1	3	1	
51.59	37.4	0.4651	-1	1	4	
52.59	43.5	0.182	0	2	3	
54.5	30	0.1416	6	0	-2	
57.03	60	0.1416	5	1	0	
61.44	19.4	0.1011	1	3	2	
66.37	19.2	0.1213	7	1	-3	
68.49	17.2	0.182	0	4	0	

Table S4. DRX indexed peaks and crystallographic data of $SnCd_{0.50}Ox$ MOF.

°2θ	Peak height	FWHM	(H k l)	d Å	Space Group	Chemical Formula
9.88	493.2	0.1011	(0 0 2)	8.9405	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
12.54	714.6	0.0809	(0 1 2)	6.8441	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
19.21	1000	0.1415	(1 1 0)	4.6195	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
19.61	287.9	0.1213	(1 1 -1)	4.5281	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
19.85	210	0.142	(0 0 4)	4.4711	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
20.96	248	0.1415	(2 0 0)	4.2423	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
22.35	464.5	0.1213	(2 0 -2)	3.9779	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
23.02	228	0.1415	(1 0 3)	3.863	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
25.22	656.2	0.1213	(0 3 1)	3.531	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
25.59	708.5	0.2426	(1 1 1)	3.2841	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
27.46	805.1	0.2244	(-1 1 2)	3.2481	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
30.97	255.5	0.1415	(3 1 -1)	2.888	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
31.68	282	0.1415	(1 1 5)	2.8263	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
33.81	180	0.1415	(0 4 0)	2.6513	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
34.4	182.2	0.9099	(1 3 3)	2.6072	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
34.66	280.2	0.2022	(4 0 -2)	2.5877	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
34.87	122.5	0.1415	(1 0 6)	2.5724	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
35.16	460	0.15	(0 2 1)	2.5516	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
35.66	310	0.1415	(301)	2.5717	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
36.93	366.1	0.224	(2 2 -1)	2.4324	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
37.6	355.6	0.1213	(3 1 -3)	2.3913	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
38.25	311.3	0.1213	(1 4 0)	2.3506	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
38.75	248.48	0.1415	(-1 1 3)	2.3265	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
40.25	155.96	0.1514	(0 0 8)	2.2404	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
42.62	120	0.1416	(4 0 0)	2.1213	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
43.11	127	0.142	(1 2 7)	2.098	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
44.42	113	0.1415	(3 1 1)	2.0395	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
45.03	156	0.1415	(-2 0 4)	2.0134	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
45.31	163.4	0.2224	(2 2 1)	2.0014	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$

Table S4 (cont.) DRX indexed peaks and crystallographic data of $SnCd_{0.50}Ox$ MOF.

°2θ	Peak height	FWHM	(H k l)	d Å	Space Group	Chemical Formula
46.88	169.6	0.2224	(2 0 6)	1.9381	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
47.82	111	0.142	(2 1 6)	1.902	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
50.38	235	0.404	(1 1 3)	1.8113	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
50.87	221.4	0.4651	(4 2 -3)	1.7945	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
50.94	222.5	0.425	(2 3 5)	1.9727	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
51.13	177.6	0.579	(0 0 10)	1.7863	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
51.48	201.3	0.6	(0 6 0)	1.775	P 21 21 21	$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$
51.61	151.9	0.49	(-1 1 4)	1.7707	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$
52.56	158.5	0.6268	(3 1 4)	1.7409	C 1 2/c 1	$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$

Table S5. DRX indexed peaks and crystallographic data of $SnCd_{0.75}Ox$ MOF.

°2θ	Peak height	FWHM	(H k l)	d Å	Space Group	Chemical Formula
12.58	1000	0.0809	(0 1 2)	7.0372	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
14.7	650	0.1011	(0 1 0)	6.0272	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
15.05	649.4	0.1011	(1 0 1)	5.8857	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
17.58	100	0.1011	(0 1 1)	5.0457	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
19.24	335	0.1213	(1 1 0)	4.613	C 1 2/c 1	$SnCd_{0.05}(C_2O_4)_{0.36}(DMF)_{1.84}$
19.62	137	0.1011	(1 1 -1)	4.5259	C 1 2/c 1	$SnCd_{0.05}(C_2O_4)_{0.36}(DMF)_{1.84}$
19.85	137	0.1011	(0 0 4)	4.4703	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
20.98	221	0.1011	(2 0 0)	3.9713	C 1 2/c 1	$SnCd_{0.05}(C_2O_4)_{0.36}(DMF)_{1.84}$
24.27	198.7	0.1415	(0 1 2)	3.6671	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
24.98	178.5	0.0809	(1 2 1)	3.5648	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
25.3	401.2	0.2224	(0 3 1)	3.5209	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
26.62	347.8	0.4651	(1 1 1)	3.3482	C 1 2/c 1	$SnCd_{0.05}(C_2O_4)_{0.36}(DMF)_{1.84}$
27.49	362.34	0.1011	(-1 1 2)	3.245	C 1 2/c 1	$SnCd_{0.05}(C_2O_4)_{0.36}(DMF)_{1.84}$
28.7	276.9	0.1011	(1 2 3)	3.1108	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$

Table S5 (cont.) DRX indexed peaks and crystallographic data of $SnCd_{0.75}Ox$ MOF.

°2θ	Peak height	FWHM	(H k l)	d Å	Space Group	Chemical Formula
29.6	100	0.1011	(0 2 0)	3.0183	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
29.7	276.9	0.1011	(0 3 3)	3.0086	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
31.17	183	0.0809	(0 2 1)	2.8691	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
31.26	277.5	0.0607	(0 1 6)	2.8613	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
31.43	110.8	0.1011	(1 0 3)	2.8462	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
31.47	221	0.1011	(1 2 4)	2.8223	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
34.42	204.2	0.3842	(1 3 3)	2.6057	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
35.2	144	0.1618	(2 0 0)	2.5494	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
36.77	107.4	0.1213	(2 0 2)	2.4446	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
37.16	99.4	0.1213	(0 4 3)	2.4199	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
37.64	71.1	0.1618	(2 1 2)	2.3896	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
37.84	25	0.1011	(3 0 1)	2.3778	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
38.35	50	0.1011	(2 0 3)	2.3473	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
38.75	25	0.1011	(2 2 -2)	2.324	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
40.3	50	0.1011	(0 0 8)	2.2381	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
41	20	0.1011	(2 1 3)	2.2015	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
43.15	30	0.1011	(1 2 7)	2.0967	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
43.64	30	0.1011	(0 3 7)	2.0743	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
44.45	20	0.1011	(2 1 5)	2.0383	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
45.34	30	0.1011	(0 5 3)	2.0004	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
46.18	30	0.1011	(0 3 1)	1.9659	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
49.44	25	0.1011	(0 4 7)	1.8436	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
49.87	172.3	0.1618	(3 1 3)	1.8286	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
50.03	72.3	0.04044	(2 2 6)	1.8233	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
51.22	186.1	0.05257	(1 2 4)	1.7837	P m n a	$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$
51.56	134.6	0.065	(1 3 8)	1.7727	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
52	130.7	0.055	(2 4 3)	1.7585	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$
52.3	99.8	0.059	(1 2 9)	1.7491	P 21 21 21	$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$

Table S6. Derived empirical formulae from results of elemental analysis of MOFs samples using EDS. Data used to calculate the multiphase sample formulae was asterisked.

Sample	Element	At1 %	At2 %	At3 %	At4 %	At5 %	Average At. %	Average atomic ratio	Empirical Formula
Cd-Ox	C	29.74	31.68	-	-	-	30.71 (±1.4)	1.86	$Cd(C_2O_4)_{0.8}$ (orthorrombic)
	O	51.98	53.54	-	-	-	52.76 (±1.1)	3.19	
	Cd	18.29	14.79	-	-	-	16.54 (±2.5)	1	
Sn-Ox	C	22.46	22.3	23.51	-	-	22.75 (±0.7)	2.03	$Sn(C_2O_4)_{0.45}(DMF)_{1.51}$ (monoclinic)
	O	48.14	49.52	49.21	-	-	48.95 (±0.7)	4.37	
	Sn	12.6	11.13	10.17	-	-	11.3 (±1.1)	1	
	N	16.81	17.05	17.11	-	-	17.1(±0.16)	1.51	
SnCd0.25-Ox	C	14.26	22.62	17.79	22.17	23.2	20.0 (±3.86)	1.86	$SnCd_{0.011}(C_2O_4)_{0.45}(DMF)_{1.23}$ (monoclinic)
	O	50.07	46.21	48.32	48.08	48.93	48.32(±1.04)	3.98	
	Cd	0.25	0.35	0.24	0.14	0.12	0.22(±0.89)	0.011	
	Sn	14.52	16.07	15.62	12.73	11.64	14.11(±1,89)	1	
	N	20.89	14.76	18.02	16.88	13.11	16.73(±2.99)	1.23	
SnCd0.50-Ox		*	*	**	**	**	**Aver. at.**	**ratio**	****$SnCd_{0.015}(C_2O_4)_{0.44}(DMF)_{1.61}$ (monoclinic)**
	C	16.87	18.1	21.8	23.63	22.17	* 1.52	** 2.06	
	O	50.35	51.7	48.14	47.99	49.73	4.45	4.44	***$SnCd_{0.015}(C_2O_4)_{0.55}(DMF)_{1.72}$ (orthorrombic)**
	Cd	0.22	0.13	0.21	0.17	0.11	0.015	0.015	
	Sn	12.65	10.51	12.78	10.07	10.36	1	1	
	N	19.92	19.56	17.07	18.15	17.62	1.72	1.61	
SnCd0.75-Ox	C	* 24.32	** 17.84	* 21.89	*** 27.85		* 2.2	** 1.43	*** 1.64	***$SnCd_{0.05}(C_2O_4)_{0.36}(DMF)_{1.84}$ (monoclinic)**
	O	46.03	47.78	46.77	44.3		4.4	3.84	2.61	
	Cd	0.52	3.82	0.54	16.97		0.05	0.3	1	****$SnCd_{0.3}(C_2O_4)_{0.51}(DMF)_{1.46}$ (orthorrombic)**
	Sn	10.12	12.44	11	2.22		1	1	0.13	
	N	19.01	18.13	19.8	8.66		1.84	1.46	0.51	*****$CdSn_{0.13}(C_2O_4)_{0.5}(DMF)_{0.51}$ (orthorrombic)**

2. Additional voltammetric testing of MOF catalysts

To assess catalyst stability, cyclic voltammetry was performed in nitrogen-saturated 0.1 M KOH. Ten cycles of voltammetry were measured at a scan rate of 1 V s^{-1} to ensure the stability of the materials. Figure S1 shows that no changes occur during the voltammetric test, for example SnCd0.75-Ox MOF, and no changes are observed in the faradaic current of the chronoamperometric test.

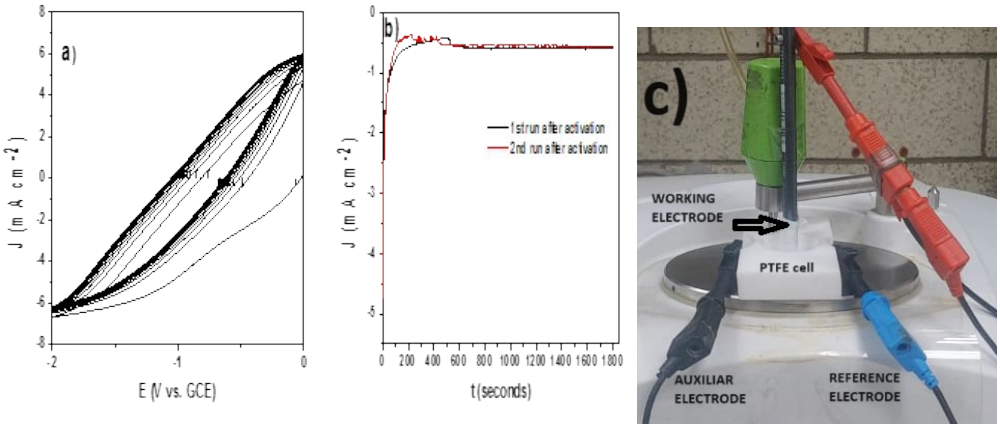

Figure S1. Stability tests to observe any material leaching or instability of the SnCd0.25-Ox sample. a) Activation cycles for the electrodes with $E_i = 0\,V$, $E_1 = -2\,V$, $E_2 = 0\,V$, and $\nu = 1\,V\,s^{-1}$ and b) Chronoamperogram of the electrocatalysts measured at a cathodic potential of potential -0.5 V vs Ag/AgCl for a period of 30 min. c) The PTFE cell used for spectroelectrochemical experiments.

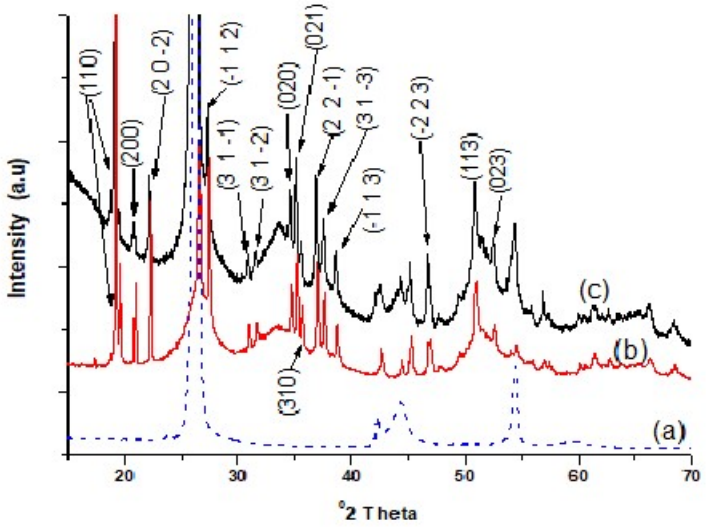

Figure S2. a) DRX pattern of graphite plate substrate. b) DRX pattern of SnCd0.25-Ox MOF sample. c) DRX diffraction pattern of graphite substrate coated with the SnCd0.25-Ox MOF sample measured after the activation cycles for the electrodes with $E_i = 0\ V$, $E_1 = -2\ V$, $E_2 = 0\ V$, and $\nu = 1\ V\ s^{-1}$.

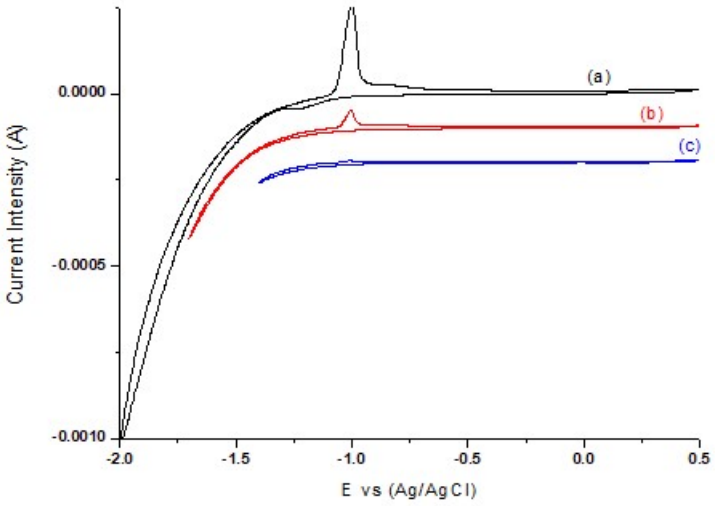

Figure S3. Voltammetric tests in 0.1M KOH medium using the catalyst Sn -OX. a) $E_i = 0\ V$, $E_1 = -2\ V$, $E_2 = 0\ V$, and $\nu = 0.05\ V\ s^{-1}$. b) $E_i = 0\ V$, $E_1 = -1.7\ V$, $E_2 = 0\ V$, and $\nu = 0.05\ V\ s^{-1}$. c) $E_i = 0\ V$, $E_1 = -1.5\ V$, $E_2 = 0\ V$, and $\nu = 0.05\ V\ s^{-1}$. From the figure, it can be seen that the peak of the oxidation of the produced hydrogen decreases when the applied return potential is limited.

Table S7. Total organic carbon results from aqueous samples recovered from KOH 0.1M supporting electrolyte used in cronoamperometric experiments at -1.5V.

Aqueous Sample	Total Organic Carbon (mg/L) ± 0.3
KOH 0.1M blank, degassed and saturated with N_2	4.63
KOH 0.1M from hydrolysis with Sn-Ox	4.53
KOH 0.1M from hydrolysis with Sn-$Cd_{0.25}$Ox	4.47
KOH 0.1M from hydrolysis with Sn-$Cd_{0.5}$Ox	4.32
KOH 0.1M from hydrolysis with Sn-$Cd_{0.75}$Ox	4.32

3. Additional Spectroelectrochemistry testing of MOF catalysts

To ensure that the CO_2RR is carried out at -1.5 V, another spectroelectrochemical analysis was performed at a potential that showed a capacitive current rather than faradic (-0.77 V).
In Figure S4, ATR-FTIR spectra is shown for the electrocatalysts (a) $SnCd_{0.25}$-Ox, (b) $SnCd_{0.50}$-Ox, and (c) $SnCd_{0.75}$-Ox, where we can observe a negative band at 2341 cm^{-1} for all three electrocatalysts, this band is attributed to the asymmetric

stretching mode of CO_2 dissolved in the aqueous electrolyte. The negative intensity of the band is due to the decrease in concentration in solution. This is generally caused by CO_2 adsorbing on the catalyst or reducing it to other species. In Fig. S3a we observe the formation of some negative bands at 3675 cm, 2901 and 2988 cm^{-1}. This feature is attributed to a slight increase in the O-H vibration of alkaline media, caused by a decrease in the previously dissolved CO_2. This was observed together with the appearance of negative bands associated with the adsorption of carbonate on the catalyst at 1431, 1320, 1116 cm^{-1}, and 885 cm^{-1}. On the other hand, Figs. S3b-c shows that for the $SnCd_{0.50}$-Ox and $SnCd_{0.75}$-Ox catalysts, the incipient CO formation occurs as a product of CO_2 reduction, as evidenced by the bands at 1100 cm^{-1}.

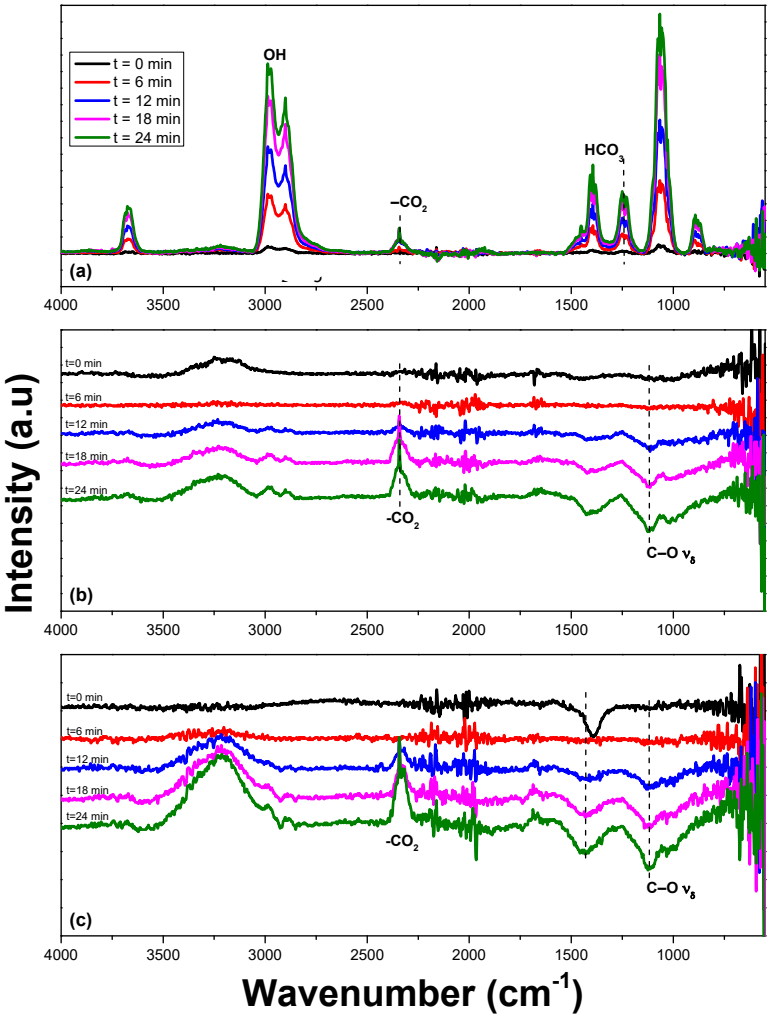

Figure S4. FTIR spectra of CO_2RR products obtained with electrocatalysts: (a) $SnCd_{0.25}$-Ox, (b) $SnCd_{0.50}$-Ox, and (c) $SnCd_{0.75}$-Ox, measured in a rich CO_2 atmosphere at a cathodic potential of –0.77 V.