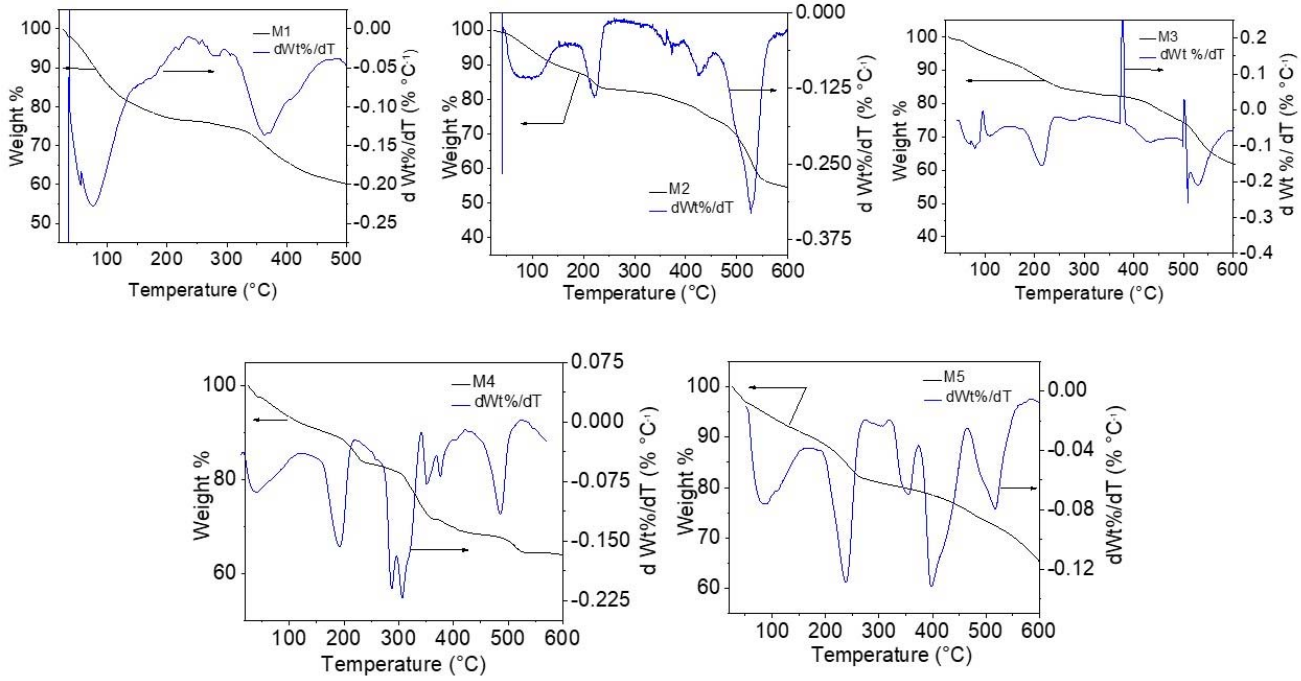

Figure S1. TGA plots (as Weight % loss and first derivative) of samples M1-M5 of CoHCFs.

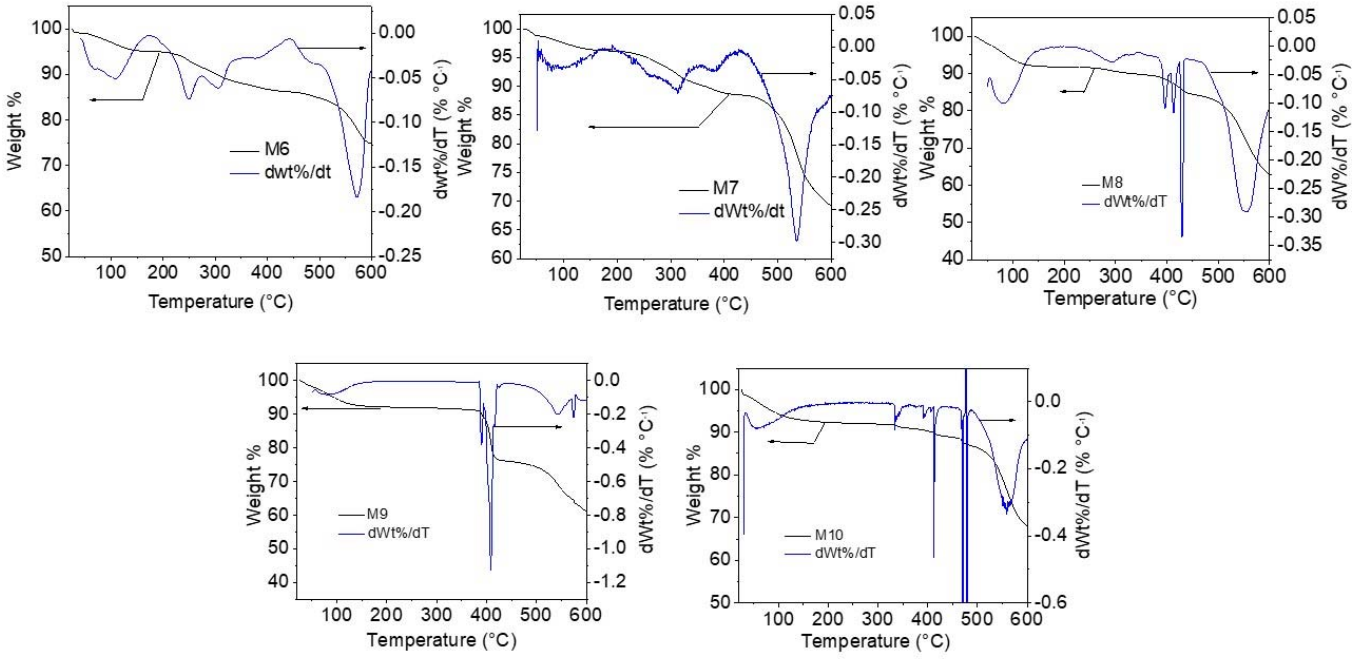

Figure S2. TGA plots (as Weight % loss and first derivative) of samples M6-M10 of CoHCFs.

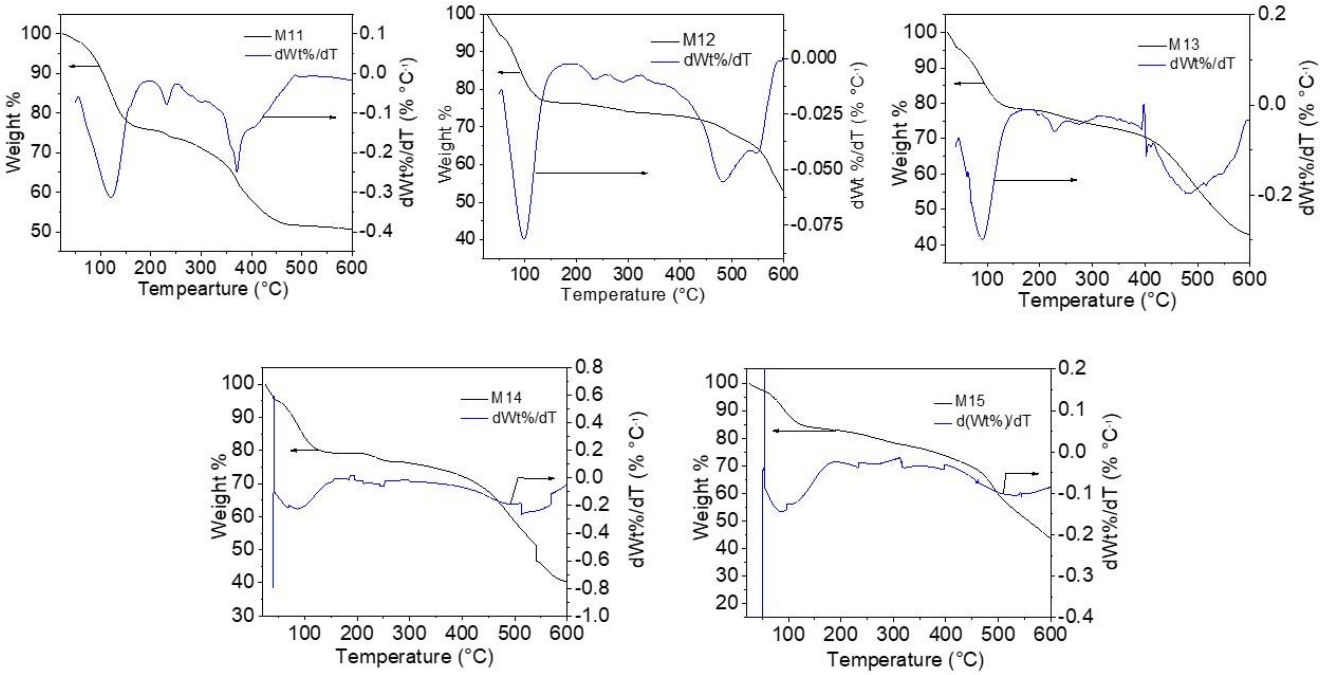

Figure S3. TGA plots (as Weight % loss and first derivative) of samples M11-M15 of CoHCFs.

XRD Rietveld refinement data on sample M6 (identified as JM57).

Refinement final output indices for single spectra:

Datafile Copia de JM57.txt : Rwp: 0.027154693, Rp: 0.020641273, Rwpnb: 0.117103845, Rwpnb1: 0.047824994, Rwpnb2: 0.028283723, Rpnb: 0.1506347Rpnb1: 0.04872347Rpnb2: 0.022067115

Rietveld refinement parameters:

a = 10.056(2)	α = 89.96(9)
b = 10.078(2)	β = 88.47(2)
c = 10.070(3)	γ = 90.39(9)

Rexp (%) = 1.750733

Table S1. XRD Atomic coordinates of sample M6.

ATOM	x	y	z	Biso Factor	Occupancy
K0	0.21339537	0.26930714	0.78935	0.78935	1
K1	0.2496001	0.75391525	0.78258544	0.0046095275	1
K2	0.24240327	0.7701745	0.2682679	0.004609286	1
K3	0.21683615	0.24036963	0.21854377	0.0046096193	1
K4	0.71135676	0.25506827	0.26587352	0.004609263	1
K5	0.70397973	0.756127	0.25189558	0.004609728	1
K6	0.6954931	0.7754539	0.77313817	0.0046092668	1
K7	0.69231606	0.24304779	0.7043417	0.0046095457	1
Fe8	0.007862565	2.6617525×10^{-4}	$-1.7655495 \times 10^{-4}$	0.0046102116	1
Fe9	0.013405314	0.4905588	0.4670046	0.00461002	1

Fe10	0.50426894	0.0016125675	0.47941646	0.0046095983	1
Fe11	0.47650135	0.5025435	−0.0011604204	0.0046108235	1
Co12	0.47473544	0.01544629	0.008525457	0.0046102614	1
Co13	0.49559	0.51086295	0.5130797	0.0046096933	1
Co14	7.144763×10^{-4}	0.013408481	0.5082449	0.0046090684	1
Co15	6.7425007×10^{-4}	0.5076396	0.008664027	0.0046099504	1
C16	0.51991403	0.19398375	−0.0027277668	0.0046093063	1
C17	0.493107	0.5159492	−0.004348543	0.0046094134	1
C18	0.0036056023	7.6885894×10^{-4}	0.8442555	0.0046093212	1
C19	0.77849215	1.5382229×10^{-4}	0.0026891972	0.004609467	1
C20	0.49899247	0.0033021613	0.6528794	0.0046090805	1
C21	0.20132203	0.003101261	9.511535×10^{-4}	0.0046094847	1
C22	0.53107595	0.80303895	0.47454295	0.0046095494	1
C23	0.5035077	0.2395549	0.41985938	0.0046090656	1
C24	0.0037762842	0.4025754	0.26357687	0.0046095867	1
C25	0.8343898	0.53006595	0.51570225	0.004609332	1
C26	0.4736673	0.57889044	0.22773653	0.0046094237	1
C27	0.15110737	0.49002242	0.5022098	0.0046090614	1
C28	0.0052313176	0.21458119	0.45735332	0.004608982	1
C29	2.9247883×10^{-4}	0.7822422	0.26811823	0.0046094405	1
C30	0.47687852	0.0010089532	0.32254997	0.0046087657	1
C31	0.28786176	1.564865×10^{-4}	0.5074434	0.004609527	1

ATOM	**x**	**y**	**z**	**Biso Factor**	**Occupancy**
C32	$-9.5801783 \times 10^{-4}$	0.0013666921	0.1868362	0.004609006	1
C33	0.6270393	−0.0017123559	0.51883554	0.004609003	1
C34	0.004478851	0.97109765	−0.009933286	0.004609334	1
C35	3.31533×10^{-4}	0.25316003	−0.0027350863	0.0046091643	1
C36	0.48826376	0.4708269	0.8599329	0.0046095187	1
C37	0.23741168	0.6082885	0.004991114	0.004609309	1
C38	-7.6391×10^{-4}	0.51240784	0.628015	0.0046090637	1
C39	0.6518778	0.483303	4.224629×10^{-4}	0.0046091457	1
N40	0.7013715	0.0079332935	0.0032429472	0.004609518	1
N41	−0.0015269169	0.028602712	0.67092264	0.004609163	1
N42	0.5344147	0.7771988	0.005029325	0.0046091895	1

N43	0.5586271	0.20617616	−0.0044596605	0.0046092677	1
N44	0.4797129	0.001539663	0.8114993	0.0046088947	1
N45	0.28558052	3.3445022×10^{-4}	0.010179597	0.004609405	1
N46	0.7185487	0.5151947	0.48919123	0.0046096263	1
N47	−0.002440368	0.56496763	0.22910292	0.0046093827	1
N48	0.44147006	0.27255192	0.5434033	0.004608775	1
N49	0.48737404	0.61859256	0.4524773	0.00460903	1
N50	0.50129056	0.42573187	0.27916667	0.004609422	1
N51	0.3200124	0.5224988	0.48776066	0.004609317	1
N52	0.22760499	0.0049257716	0.48717323	0.0046098065	1
N53	0.49435413	0.020174203	0.16728099	0.0046090544	1
N54	0.0014522229	0.76633227	0.51911014	0.0046089506	1
N55	0.001489375	0.21474767	0.45598373	0.0046089897	1
N56	0.011848602	0.0013979856	0.29151845	0.0046093957	1
N57	0.8330878	3.1203078×10^{-4}	0.48224202	0.004609227	1
N58	0.22026938	0.45513877	0.004069938	0.0046092514	1
N59	0.50650257	0.52954936	0.6894973	0.0046090363	1
N60	0.0023961428	0.2575178	0.0066635218	0.004609438	1
N61	0.0011668742	0.64178675	−0.0012996352	0.0046094535	1
N62	0.010218649	0.47992063	0.80811375	0.0046089734	1
N63	0.7910187	0.515877	0.0033978862	0.0046094167	1

Table S2. XPS binding energy assignments of samples M1, M6 and M11 of CoHCFs.

Core level	M1			M6			M11		
	B.E. (eV)	Assignment	Ref.	B.E. (eV)	Assignment	Ref.	B.E. (eV)	Assignment	Ref.
C 1s	283.48	CO-Co	[1]	283.55	C–Fe^{2+}	[2]	283.13	Tape	
	283.50	C–Fe^{2+}	[2]	284.47	C(elemental)	[3]	283.77	C–Fe^{2+}	[2]
	284.53	C (elemental)/Co	[3]	285.60	Adventitious	[2]	284.03	C–Fe^{3+}	[2]
	285.4	Adventitious	[2]	287.44	KCN	[2]	285.04	Adventitious	
	287.42	$Co(CN)_x$	Present study						
O 1s	531.4	$Co(NO_3)_2$	[4]	530	CoO	[5]	530.91	Fe_xO_y	[6]
	535.4	H_2O	[7]	531.3	$Co(NO_3)_x$	[8]	531.88	$Co(NO_3)_x$	[9]
				532.58	H_2O	[10]	532.77	H_2O	[5]
				532.3	KNO3	[11]			
N 1s	396.53	N–Co^{2+}	[2]	397.30	N–Co^{2+}	[2]	396.55	Co_xN_y	[2]
	396.95	N–Co^{3+}	[2]	397.76	N–Co^{3+}	[2]	397.21	N–Co^{2+}	[12]
	400.88	$Co(NO_3)_x$	[4]	401.79	$Co(NO_3)_x$	[4]	397.7	N–Co^{3+}	[2]
				406.7	KNO_3	[11]	398.86	Satellite	
Na 1s	1071.34	$Na_nCo^{2+,3+}[Fe(CN)_6]$	[2]						
K 2p	---			292.41	K_n $Co^{2+,3+}$ $[Fe(CN)_6]$	[2]	292.62	K_n $Co^{2+,3+}$ $[Fe(CN)_6]$	[2]
	---			293.55	Satellite		291.74	Satellite	
	---			---			298.71	Satellite	[2]
Co 2p	777.57	Satellite		781.50	Satellite		783.7	Auger Fe	
	780.68	N–Co^{2+}	[4,13]	781.90	N–Co^{2+}	[4,13]	785.54	N–Co^{2+}	[4,13]
	780.80	Satellite		783.58	N–Co^{3+}	[14]	786.36	N–Co^{3+}	[14]
	783.59	N–Co^{3+}	[14]	783.7	Auger Fe		789.01	Satellite	
	783.7	Auger Fe		787.68	Satellite		791.6	Satellite	
	787.03	Satellite					791.69	Satellite	
Fe 2p	707.34	C–Fe^{2+}	[15]	708.230	Fe^0 /Satellite	[16]	711.7	Fe_xO_y	[17]
	712.7	Auger Co		709.230	C–Fe^{2+}	[15]	712.72	C–Fe^{2+}	[15]
	716.54	Satellite		709.490	C–Fe^{2+}	[15]	713.97	Auger Co	
	718.84	Satellite		713.700	Auger Co		715.27	C–Fe^{3+}	[15]
	721.34	Satellite		716.596	Satellite		718.42	Satellite	
	722.57	Satellite		722.145	Satellite		725.15	Satellite	

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