Supporting Information

Various Amide-derivatives Induced Keggin-type $SiW_{12}O_{40}^{4-}$–based Cobalt Complexes: Assembly, Structure, Electrochemical Sensing and Dye Adsorption Properties

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Table. S1. Selected bond distances (Å) and angles (°) for complexes **1**–**3**.

Complex 1			
Co(1)-O(2)	2.150(7)	Co(1)-O(1)	2.149(7)
Co(1)-N(2)	2.098(9)	Co(1)-N(1)	2.090(9)
Co(1)-O(2W)	2.144(9)	Co(1)-O(1W)	2.110(10)
O(1)-Co(1)-O(2)	170.2(3)	N(2)-Co(1)-O(2)	79.0(3)
N(2)-Co(1)-O(1)	92.8(3)	N(2)-Co(1)-O(2W)	86.8(4)
N(2)-Co(1)-O(1W)	165.7(4)	N(1)-Co(1)-O(2)	99.2(3)
N(1)-Co(1)-O(1)	77.9(3)	N(1)-Co(1)-N(2)	107.0(4)
N(1)-Co(1)-O(2W)	165.3(4)	N(1)-Co(1)-O(1W)	86.4(4)
O(2W)-Co(1)-O(2)	88.3(3)	O(2W)-Co(1)-O(1)	96.7(3)
O(1W)-Co(1)-O(2)	94.2(4)	O(1W)-Co(1)-O(1)	94.9(4)
O(1W)-Co(1)-O(2W)	80.5(4)		
Symmetry code for **1**: #1 -x+2, -y+1, -z			

Complex 2			
Co(1)-O(1)	2.103(10)	Co(1)-O(2)	2.122(10)
Co(1)-O(1W)	2.150(10)	Co(1)-O(5)	2.155(11)
Co(1)-N(1)	2.072(12)	Co(1)-N(2)	2.081(12)
O(1)-Co(1)-O(2)	174.8(4)	O(1)-Co(1)-O(1W)	88.3(4)
O(1)-Co(1)-O(5)	87.9(4)	O(2)-Co(1)-O(1W)	88.8(4)
O(2)-Co(1)-O(5)	94.7(4)	O(1W)-Co(1)-O(5)	175.0(4)
N(1)-Co(1)-O(1)	96.7(5)	N(1)-Co(1)-O(2)	78.8(5)
N(1)-Co(1)-O(1W)	85.8(4)	N(1)-Co(1)-O(5)	91.4(5)
N(1)-Co(1)-N(2)	176.9(5)	N(2)-Co(1)-O(1)	80.3(4)
N(2)-Co(1)-O(2)	104.1(4)	N(2)-Co(1)-O(1W)	93.3(4)
N(2)-Co(1)-O(5)	89.3(5)		
Symmetry code for **2**: #1 -x+1, -y+1, -z+1			

Complex 3			
Co(1)-O(2)	2.212(12)	Co(1)-N(2)#2	2.071(14)

Co(1)-O(4)#2	2.071(14)	Co(1)-O(5)	2.081(11)
Co(1)-O(1W)	2.043(13)	Co(1)-N(4)	2.050(15)
N(2)#2-Co(1)-O(2)	84.3(5)	N(2)#2-Co(1)-O(4)#2	79.1(5)
N(2)#2-Co(1)-O(5)	92.8(5)	O(4)#2-Co(1)-O(2)	92.9(5)
O(5)-Co(1)-O(2)	88.4(5)	O(5)-Co(1)-O(4)#2	171.6(5)
O(1W)-Co(1)-O(2)	174.8(5)	O(1W)-Co(1)-N(2)#2	100.3(6)
O(1W)-Co(1)-O(4)#2	90.2(5)	O(1W)-Co(1)-O(5)	89.1(5)
O(1W)-Co(1)-N(4)	97.6(6)	N(4)-Co(1)-O(4)#2	77.8(5)
N(4)-Co(1)-N(2)#2	161.9(6)	N(4)-Co(1)-O(4)	99.1(5)
N(4)-Co(1)-O(5)	89.3(5)		

Symmetry code for **3**: #1 -x+2, -y+1, -z+1 #2 x, y+1, z #3 x, y-1, z

Table. S2. Selected hydrogen bonding geometry (Å, °) for complexes **1**–**3**.

Complex	D–H···A	D–H / Å	H···A / Å	D···A / Å	D–H···A / º
	N6–H6···O11	0.86	2.19	2.957	148
1	N4–H4···O23	0.86	2.09	2.874	151
	N5–H5···O19	0.86	2.42	2.982	123
2	O1W–H1WA···O2	0.886	2.012	2.742	135
3	O1–H1···N3	0.86	2.00	2.851	171

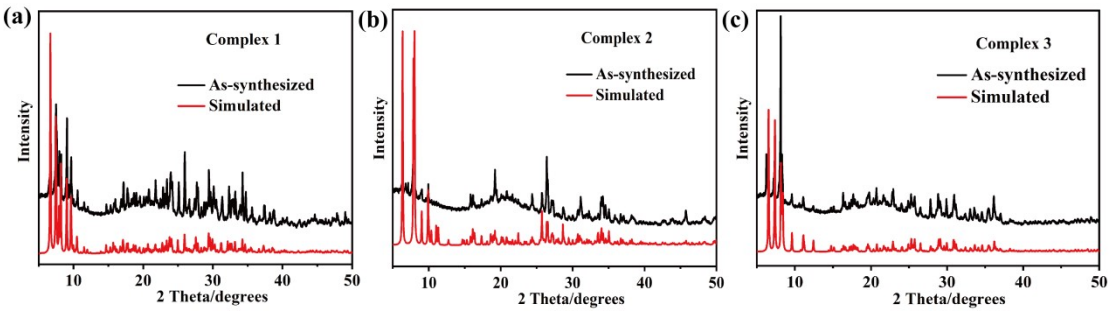

Fig. S1 The PXRD patterns of complexes **1**–**3**.

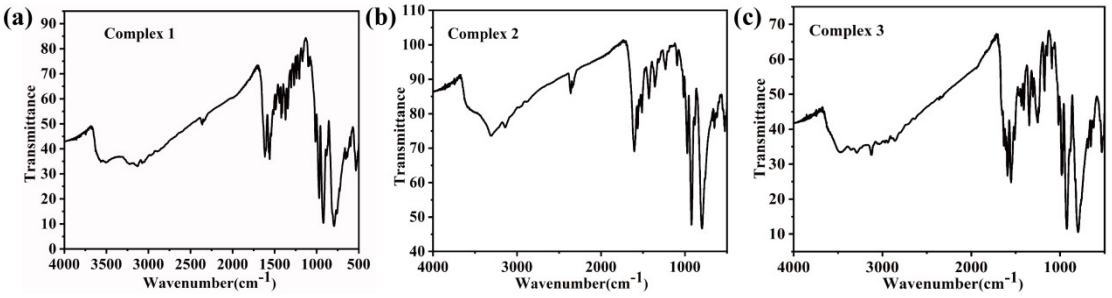

Fig. S2 The IR spectra of complexes **1**–**3**.

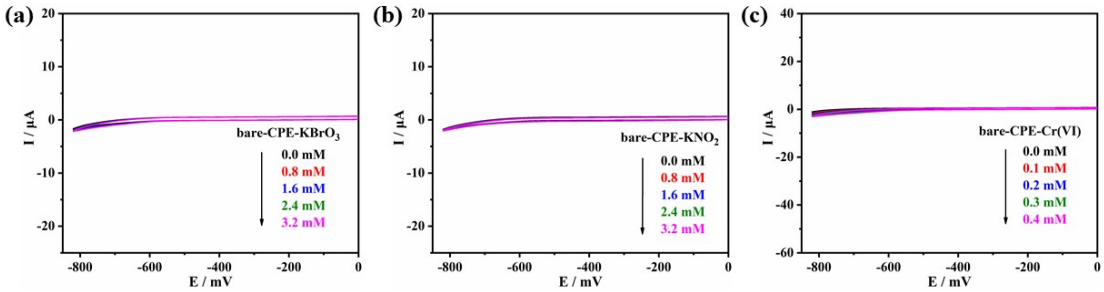

Fig. S3 The cyclic voltammograms of the bare-CPE in electrolyte solution containing BrO_3^-, NO_2^- and Cr(VI) ions.

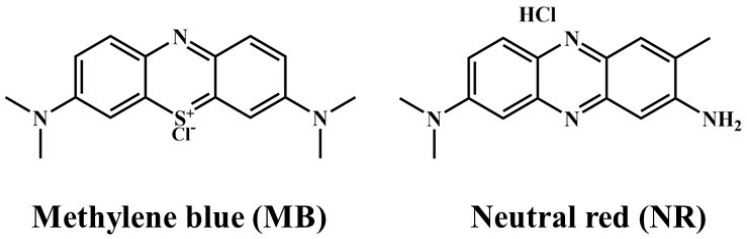

Fig. S4 The structural diagram of the selected organic dyes MB and NR.

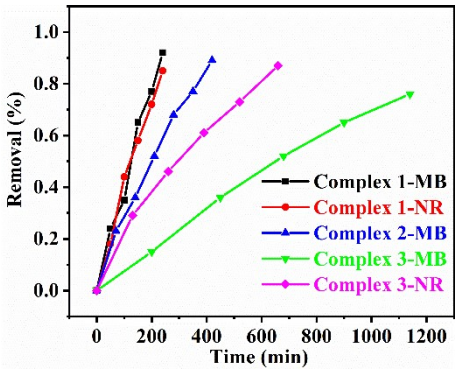

Fig. S5 Removal rate of organic dyes MB and NR by complexes **1**–**3** with time.

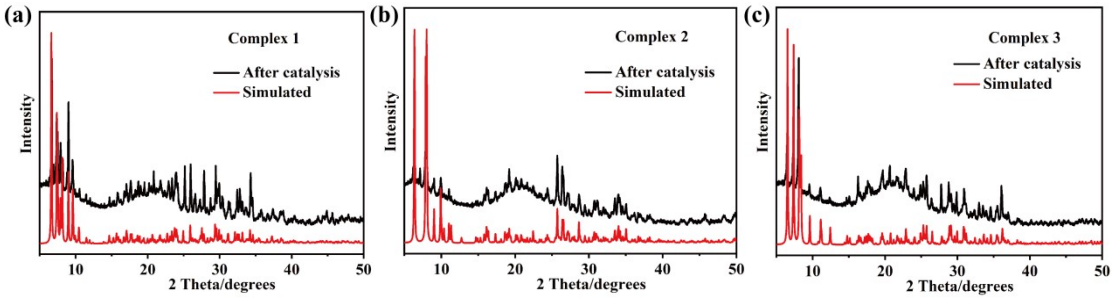

Fig. S6 PXRD patterns of complexes **1**–**3** after adsorption of MB.

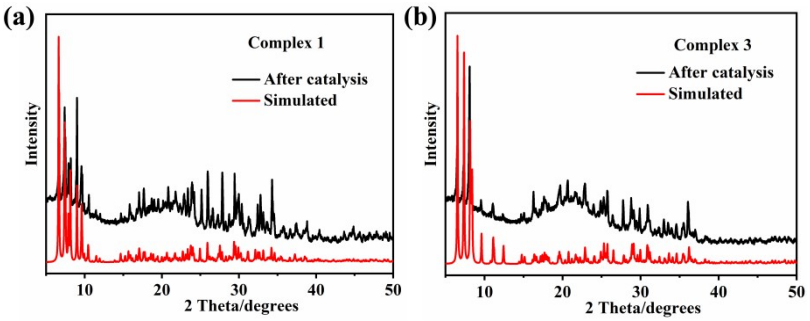

Fig. S7 PXRD patterns of complexes **1** and **3** after adsorption for NR.