

## Supporting Information

# Cr-Phthalocyanine Porous Organic Polymer as an Efficient and Selective Catalyst for Mono Carbonylation of Epoxides to Lactones

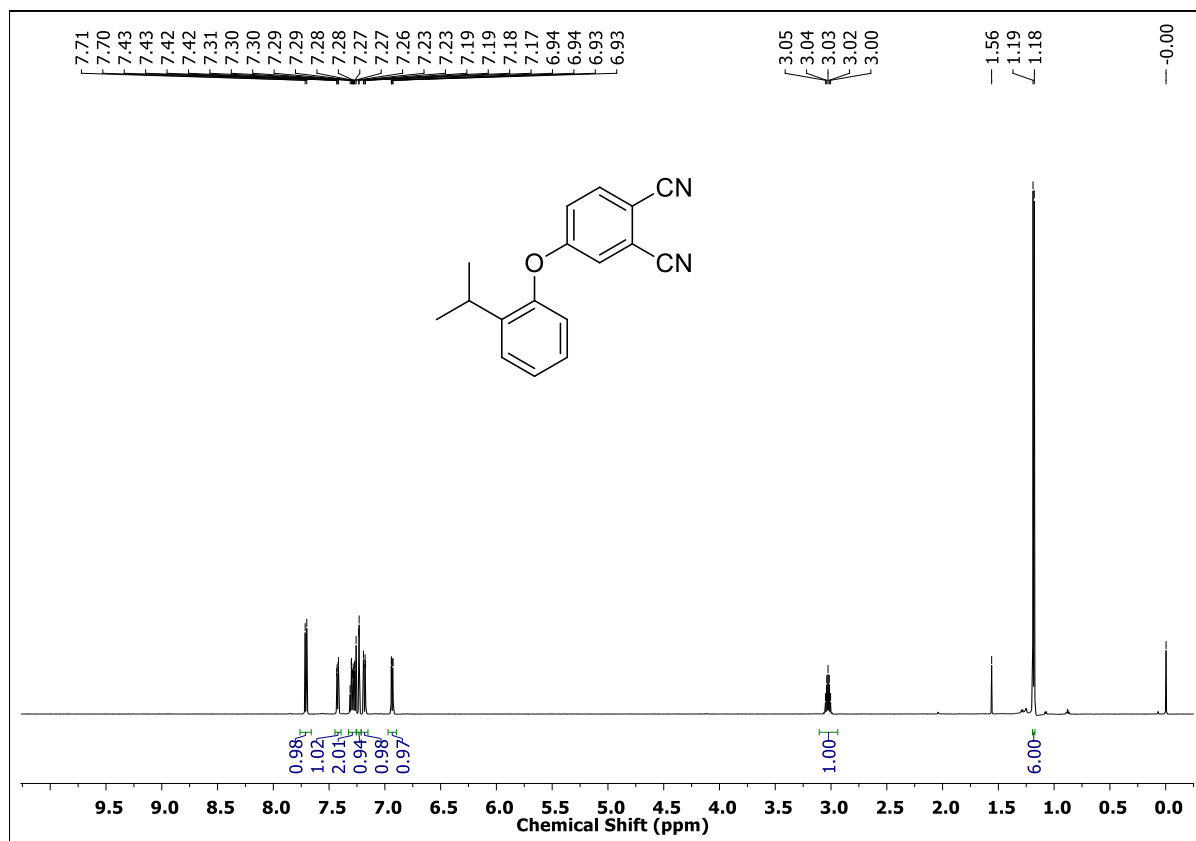
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Seoul, Republic of Korea 06974.

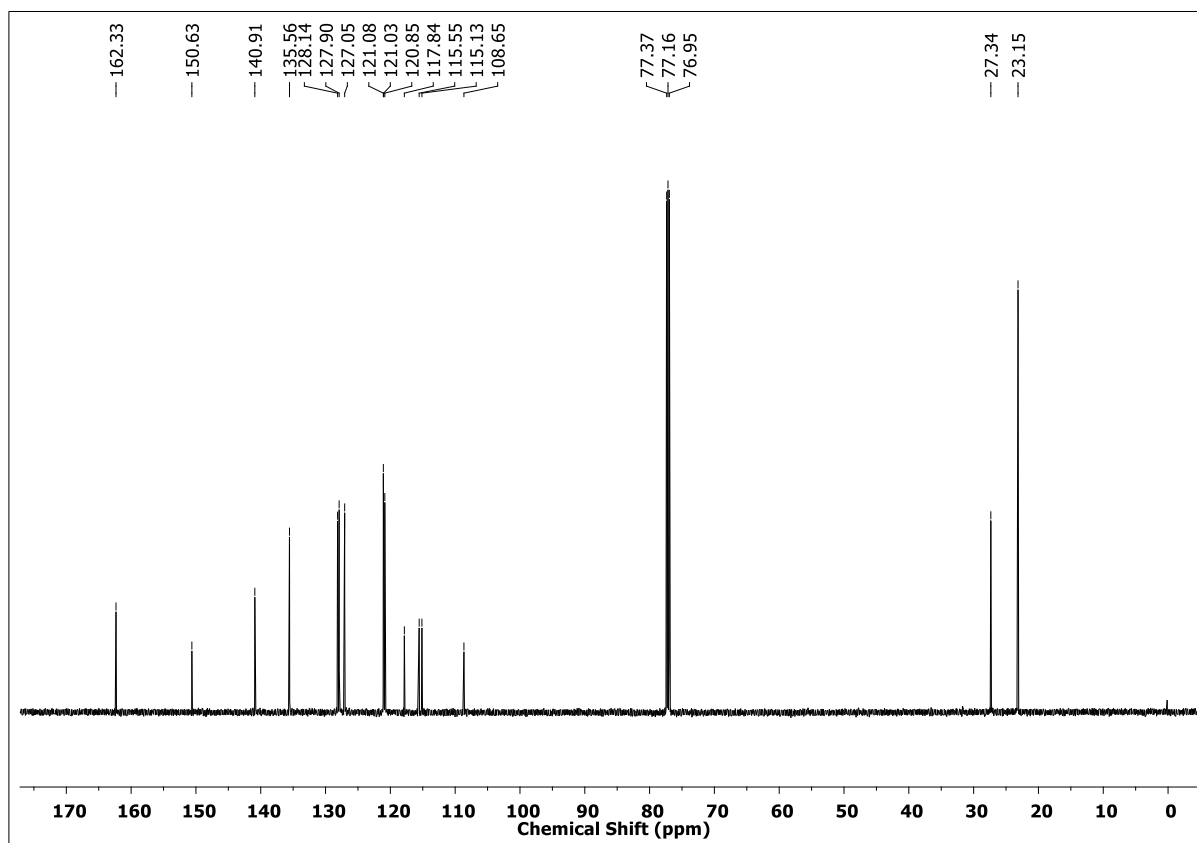
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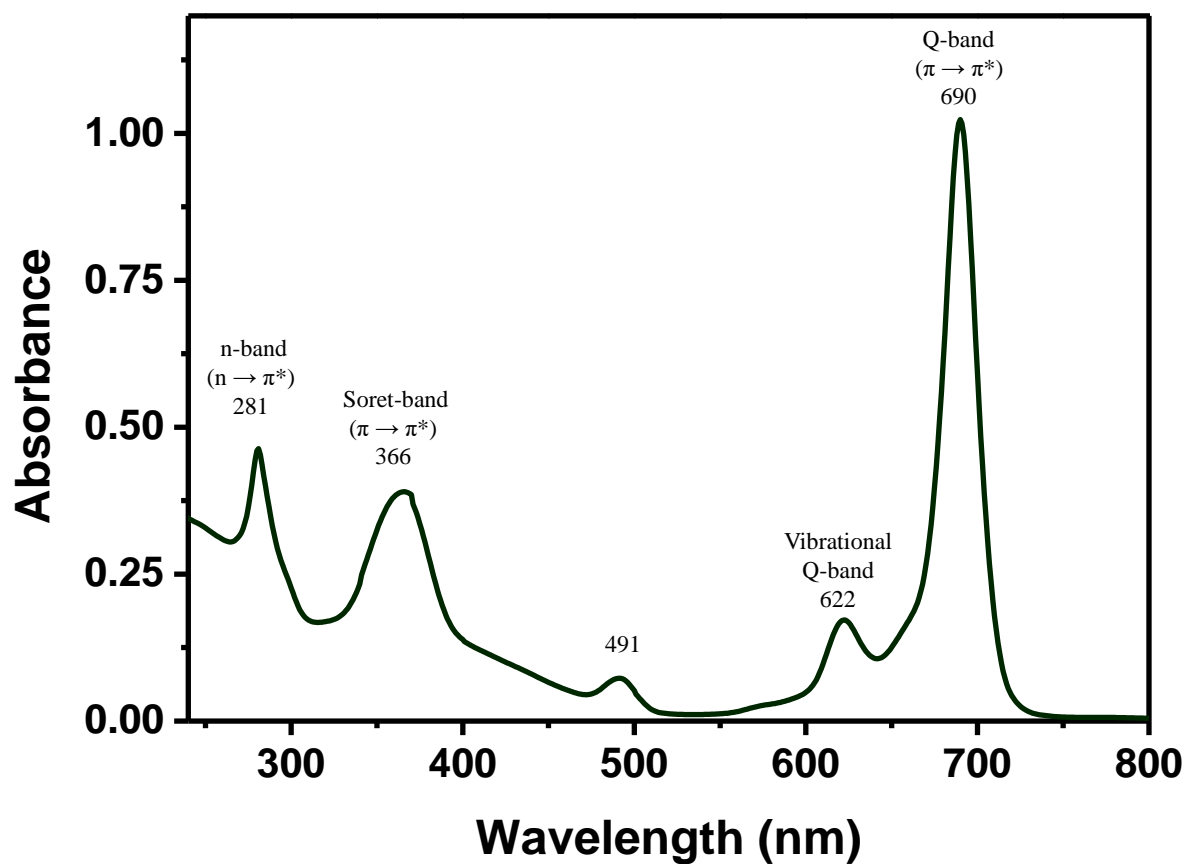
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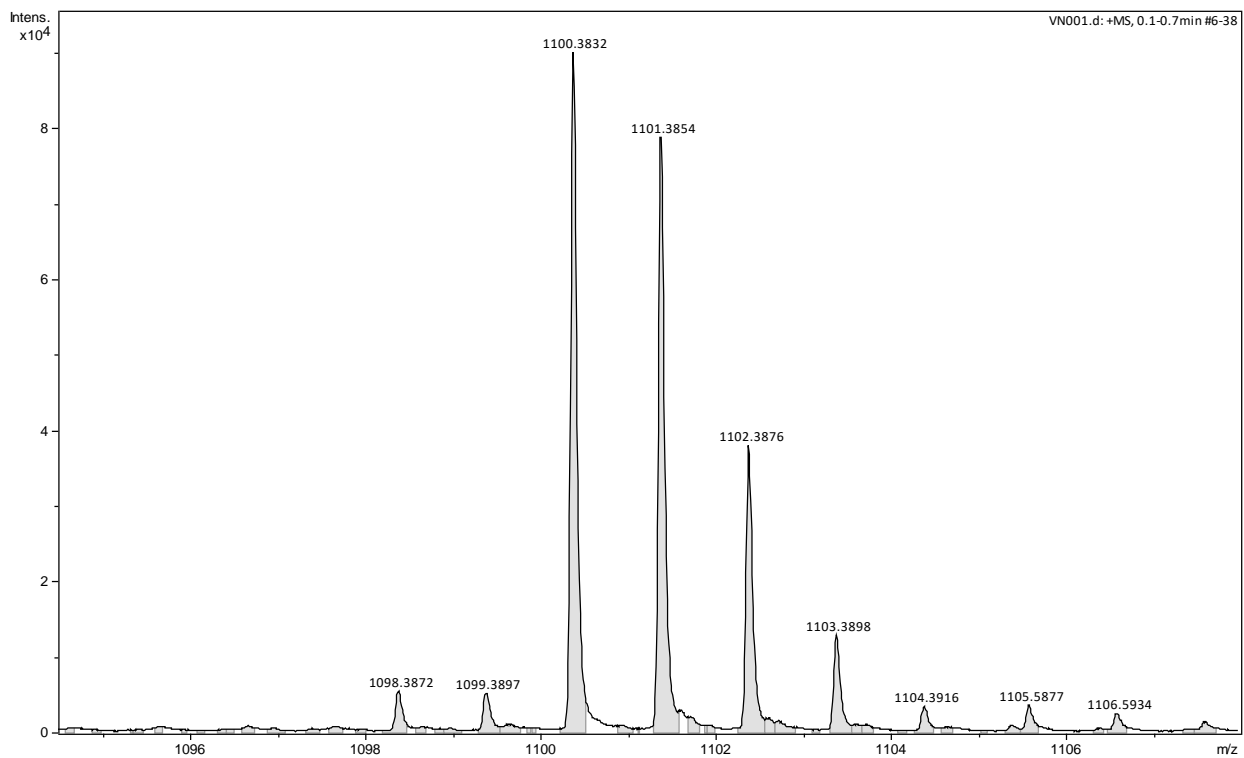
**Figure S1.** <sup>1</sup>H NMR spectrum of ligand **1** measured in CDCl<sub>3</sub>



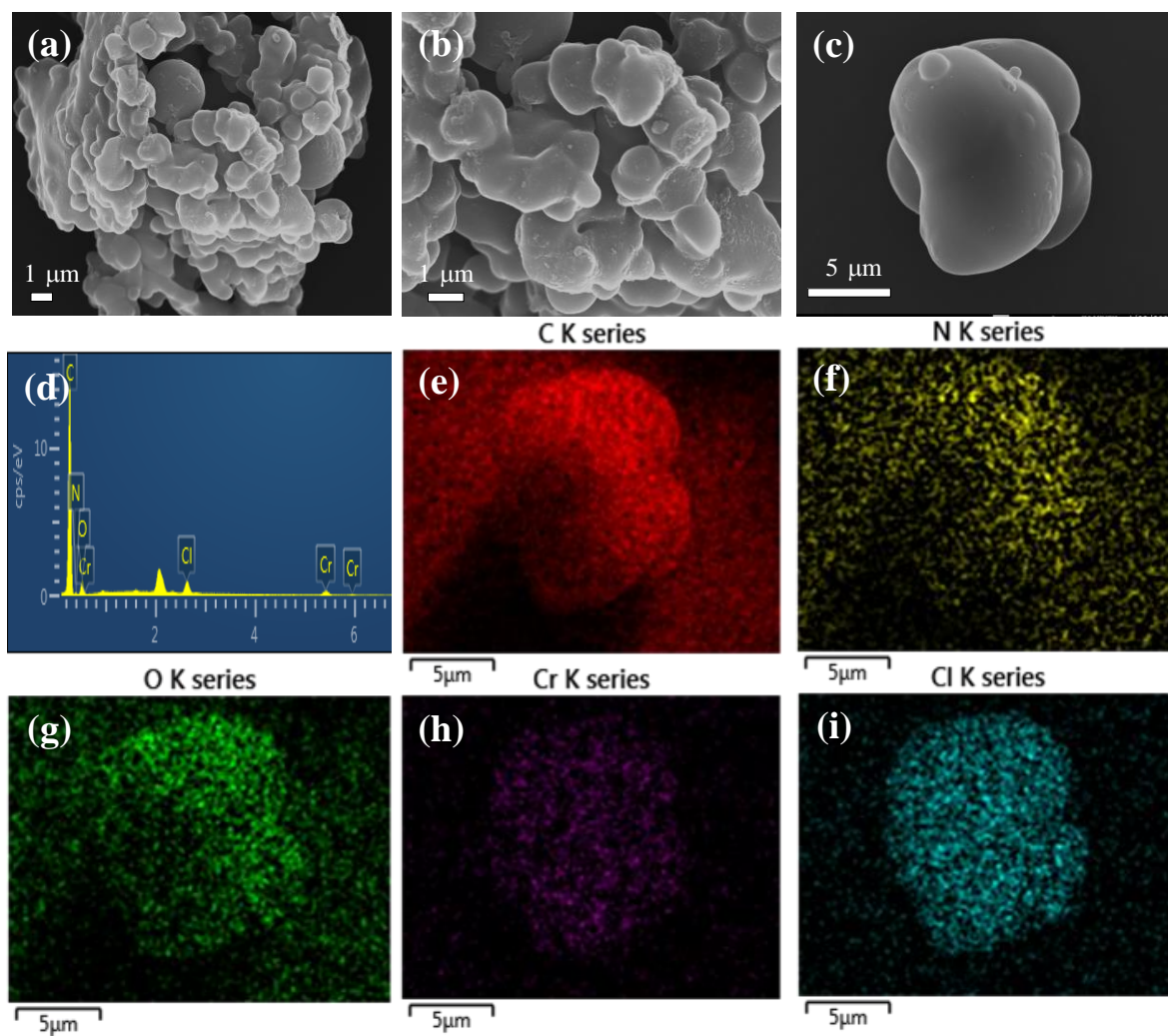
**Figure S2.**  $^{13}\text{C}$  NMR spectrum of ligand **1** measured in  $\text{CDCl}_3$



**Figure S3.** UV-Visible spectrum of Pc'Cr(III)Cl (2) measured in THF

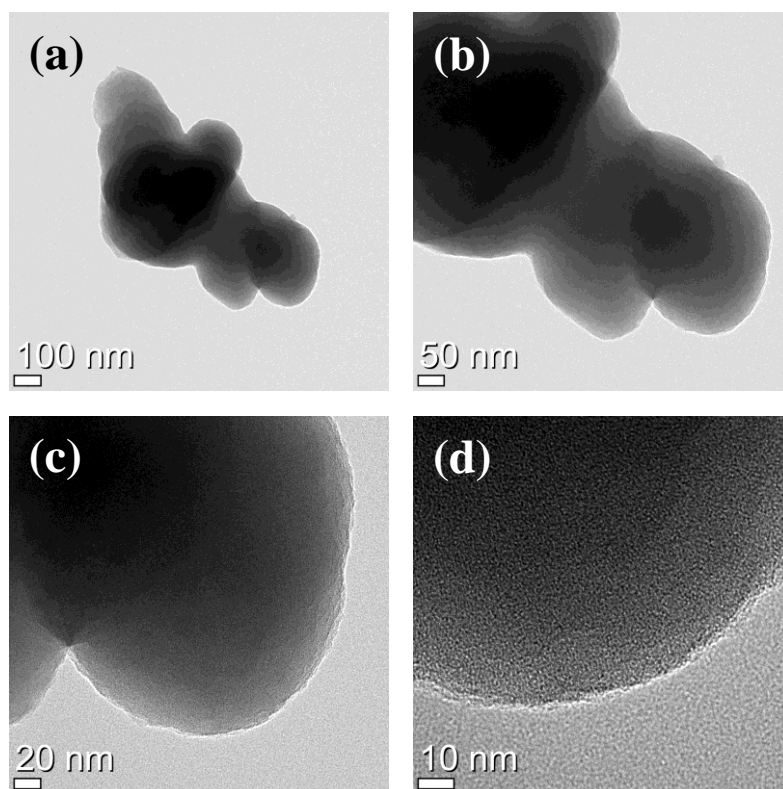


**Figure S4.** High resolution mass spectrum of Pc'Cr(III)Cl (2)



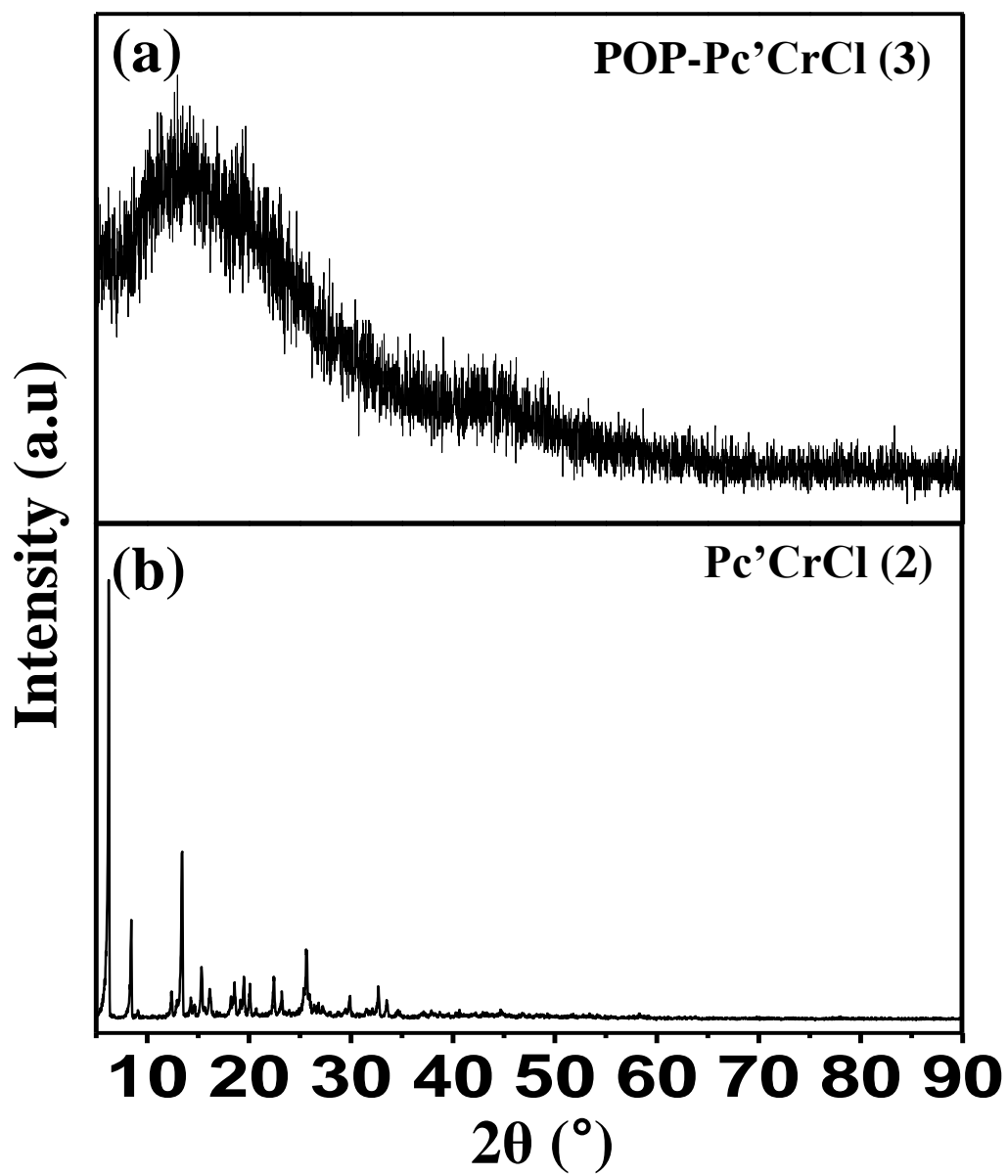
Element	Line Type	Wt%	Wt% Sigma	Atomic %
C	K series	75.81	0.81	81.39
N	K series	7.05	0.92	6.49
O	K series	13.75	0.35	11.08
Cl	K series	1.67	0.04	0.61
Cr	K series	1.73	0.07	0.43
Total:		100.00		100.00

**Figure S5.** SEM image (a-c) and EDS mapping images of (d-i) POP-Pc'Cr(III)Cl (**3**) with observed elements in the table.



**Figure S6.** TEM images of POP-Pc'Cr(III)Cl (3)





**Figure S7.** Powder X-ray diffraction pattern of POP-Pc'Cr(III)Cl (3)

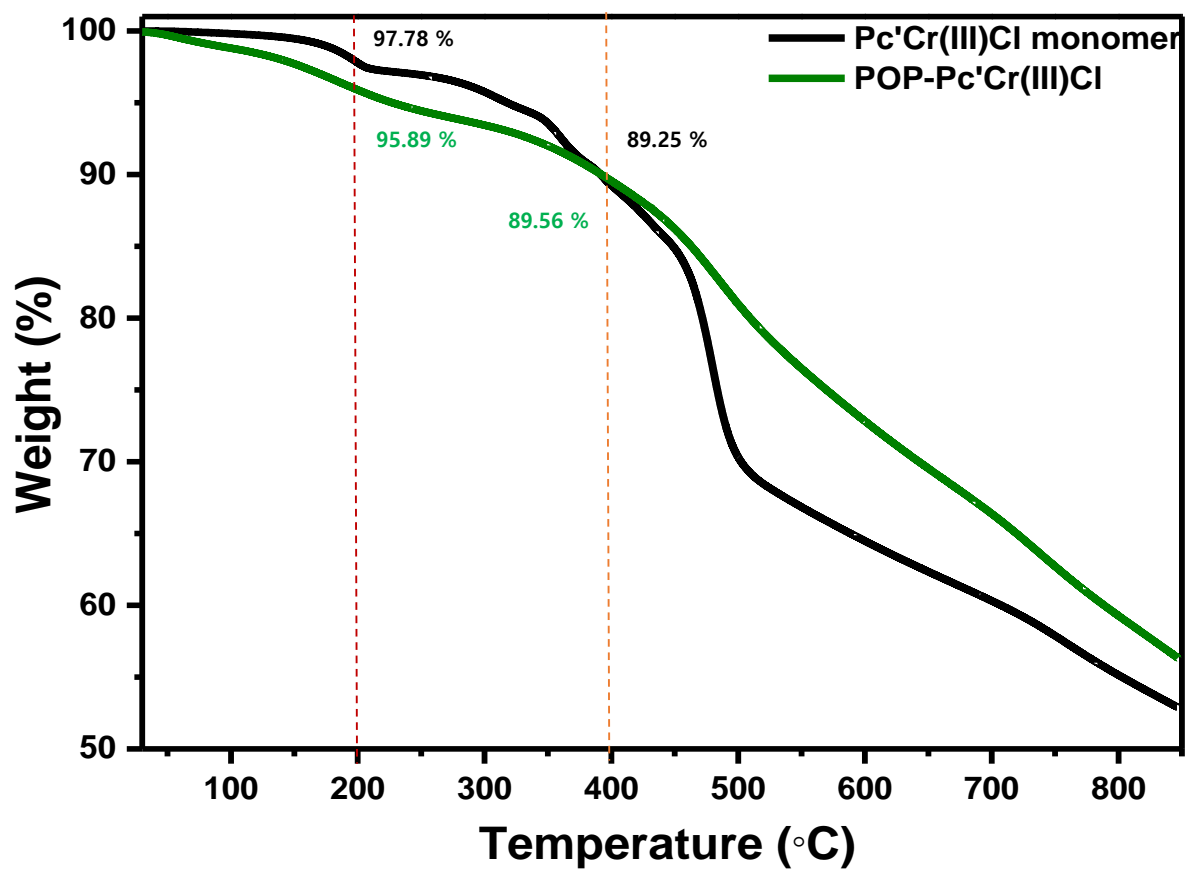
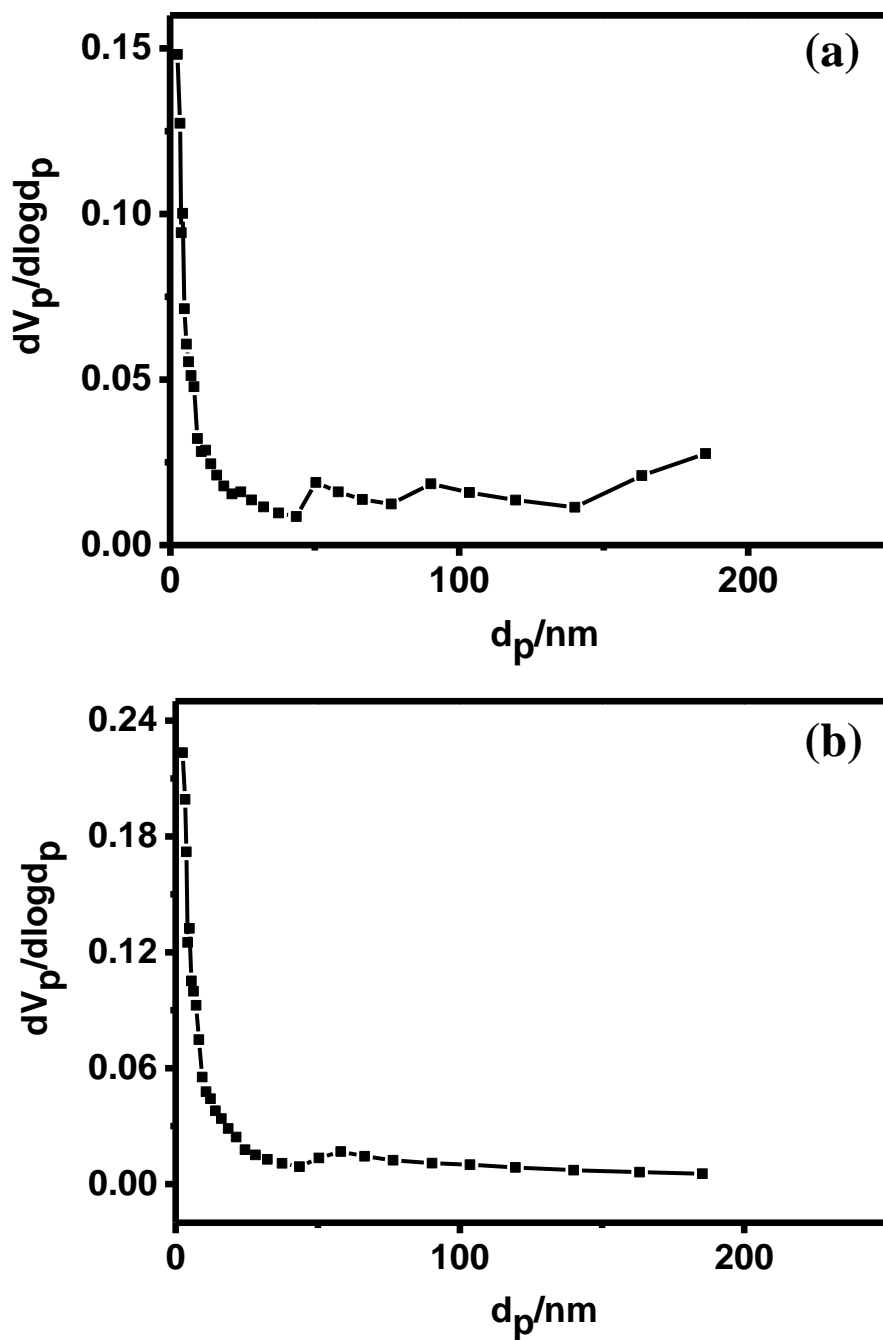
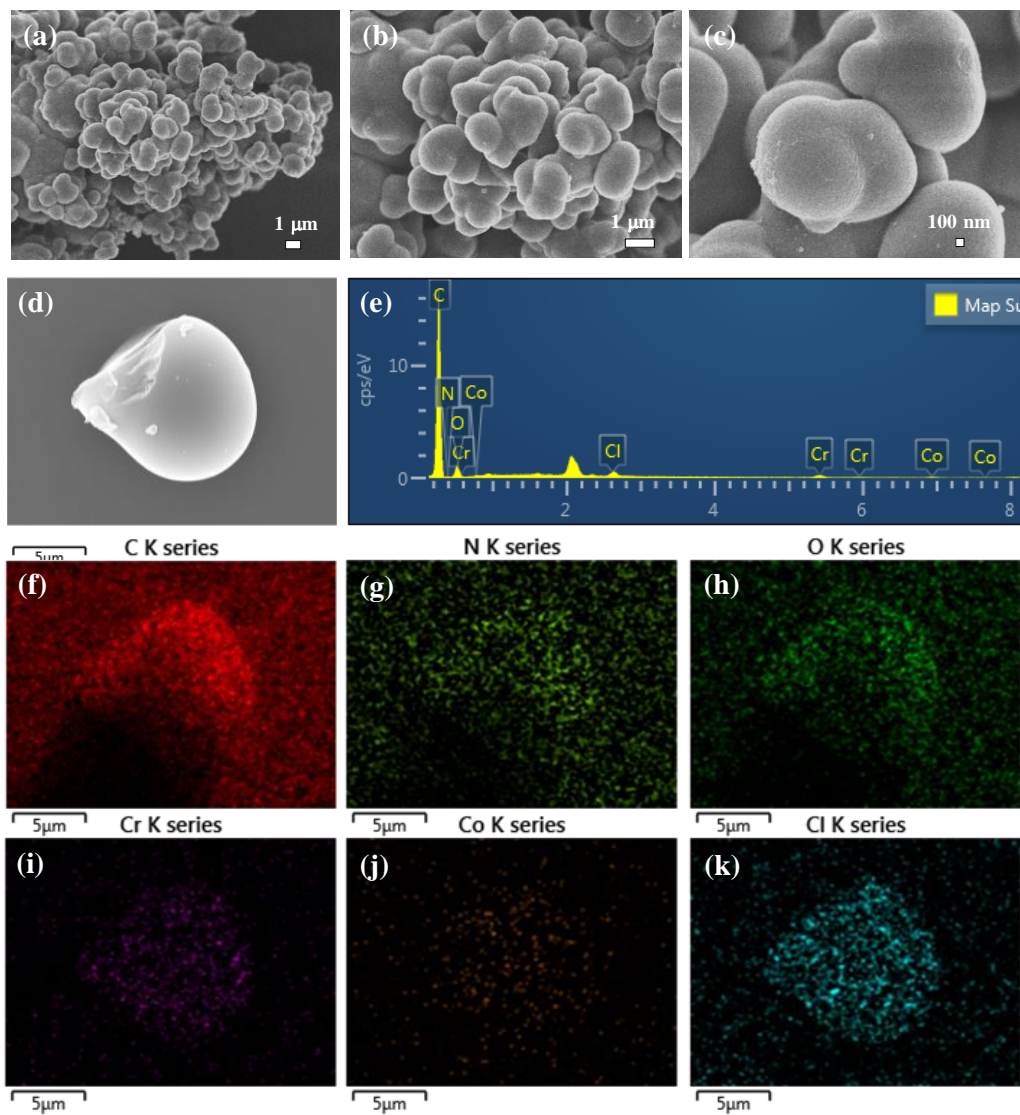


Figure S8. TGA plot of Pc'Cr(III)Cl (2) and POP-Pc'Cr(III)Cl (3) in nitrogen atmosphere.

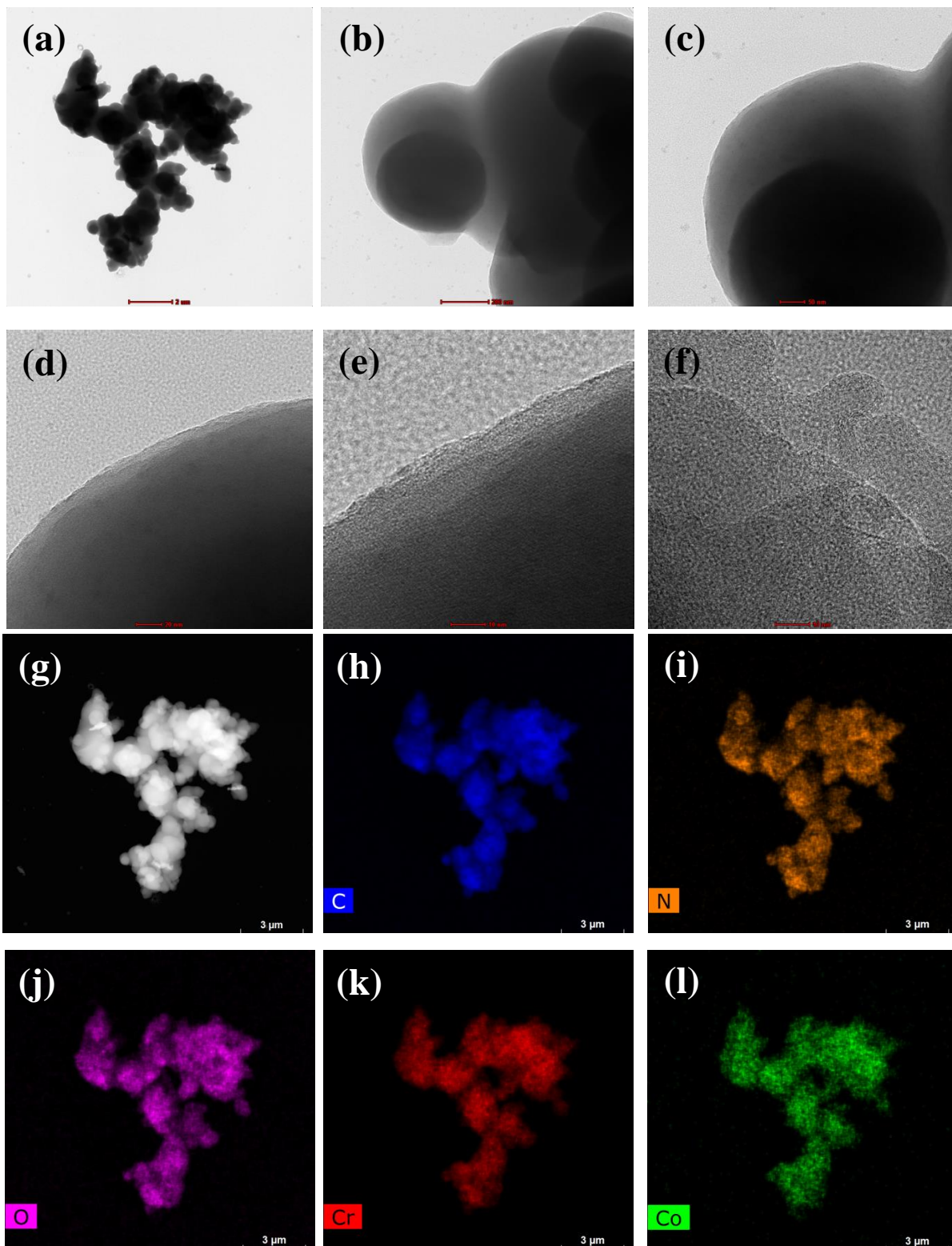


**Figure S9.** BJH pore size distribution graph of (a) POP-Pc'Cr(III)Cl (**3**) and (b) POP-Pc'Cr(III)Co(CO)<sub>4</sub> (**4**)



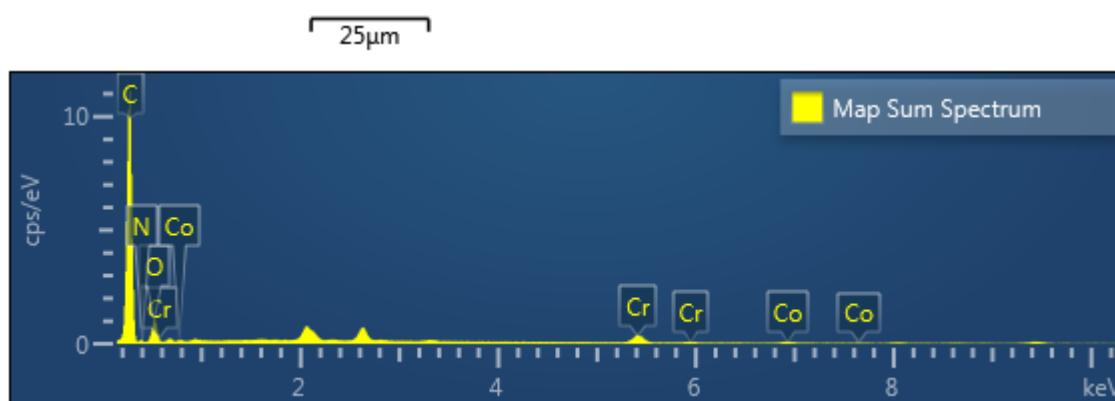
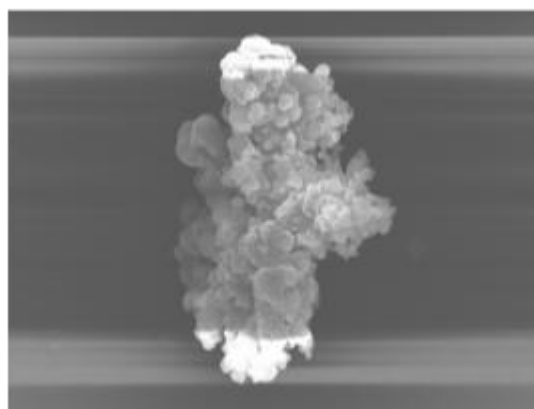
Element	Line Type	Wt%	Wt% Sigma a	Atomic %
C	K series	70.04	0.66	78.00
N	K series	10.00	0.78	9.55
O	K series	12.73	0.31	10.65
Cr	K series	5.26	0.10	1.35
Co	K series	1.95	0.08	0.44
Total:		100.00		100.00

**Figure S10.** SEM image (a-c) and EDS mapping images of (d-k) catalyst POP-Pc'Cr(III)Co(CO)<sub>4</sub> (**4**) with observed elements in the table.



**Figure S11.** TEM image (a-f) and STEM-EDS mapping analysis of catalyst POP-Pc'Cr(III)Co(CO)<sub>4</sub> (4)

Electron Image 1



Element	Line Type	Wt%	Wt% Sigma	Atomic %
C	K series	69.53	0.72	76.33
N	K series	7.57	0.86	7.13
O	K series	18.87	0.38	15.55
Cr	K series	3.06	0.09	0.78
Co	K series	0.97	0.09	0.22
Total:		100.00		100.00

**Figure S12.** SEM image and EDS spectrum of POP-Pc'Cr(III)Co(CO)<sub>4</sub> after cycle 3 with observed elements in the table.