Electronic Supplementary Information

Zeolite Encapsulated Ni(II) and Cu(II) Complexes with Tetradentate N2O2 Schiff Base Ligand: Catalytic Activity Towards Oxidation of Benzhydrol and Degradation of Rhodamine-B

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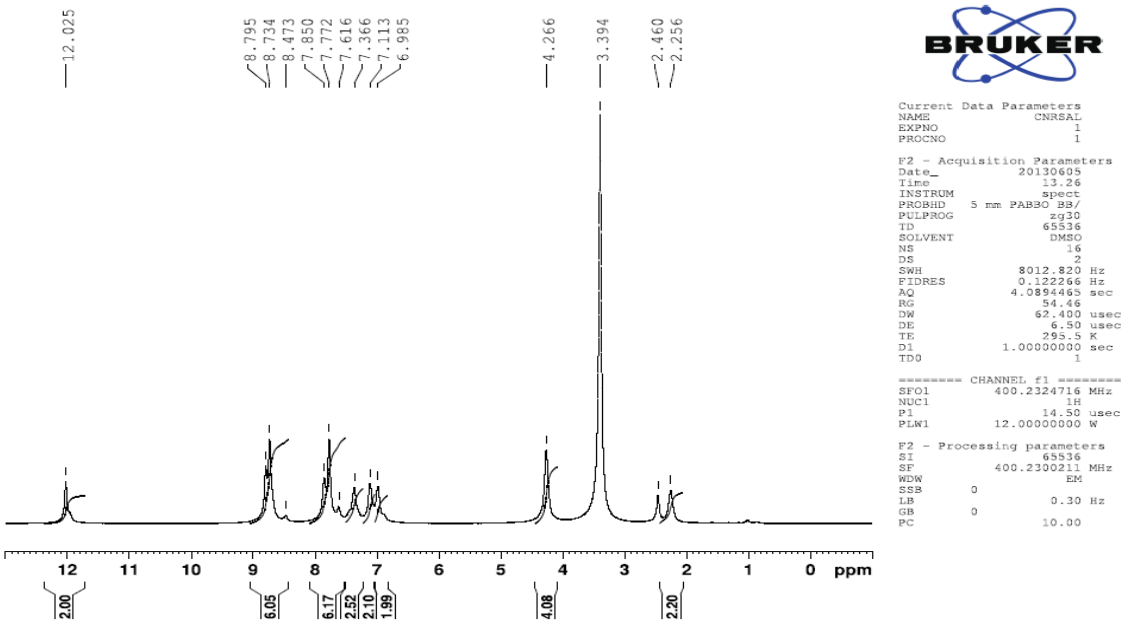


Figure .S1: ^{1}H spectra of H_2L

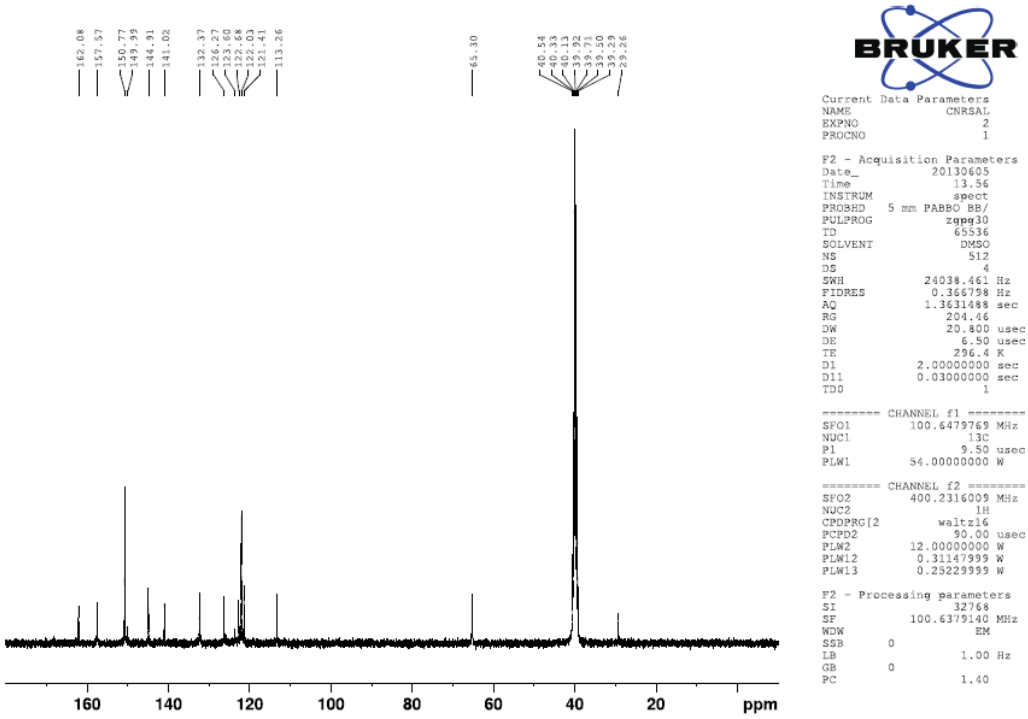


Figure .S2: ^{13}C-NMR spectra of H_2L.

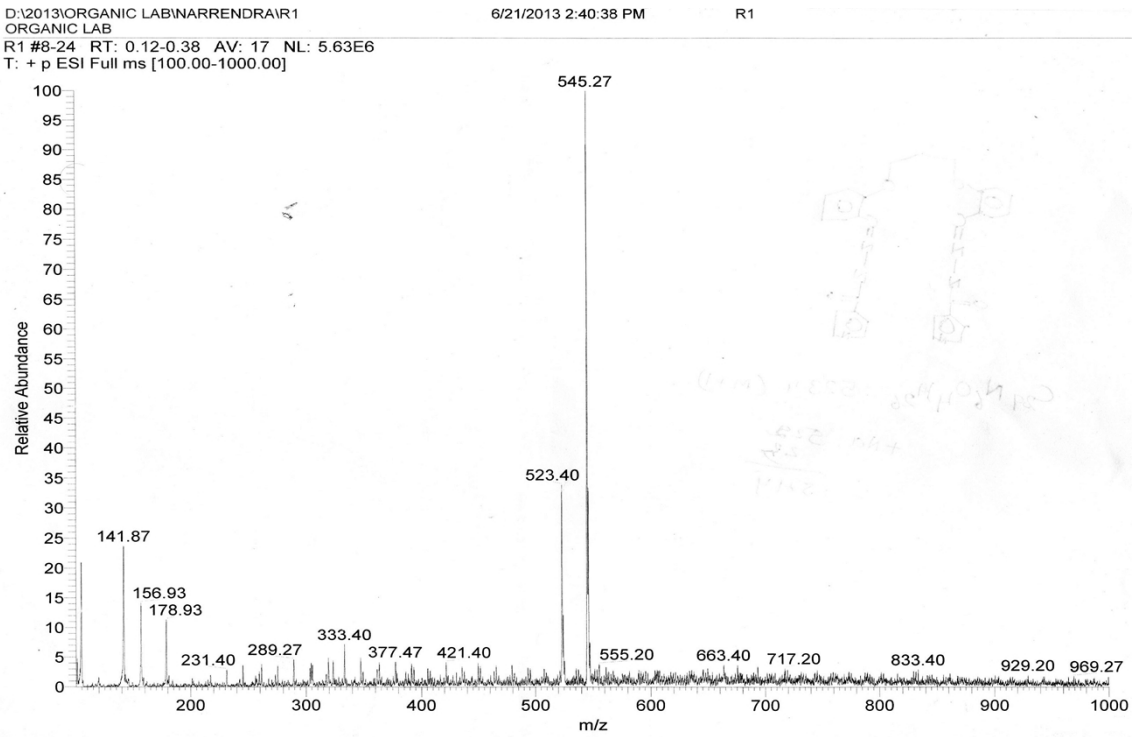


Figure S3:ESI-mass spectra of H_2L

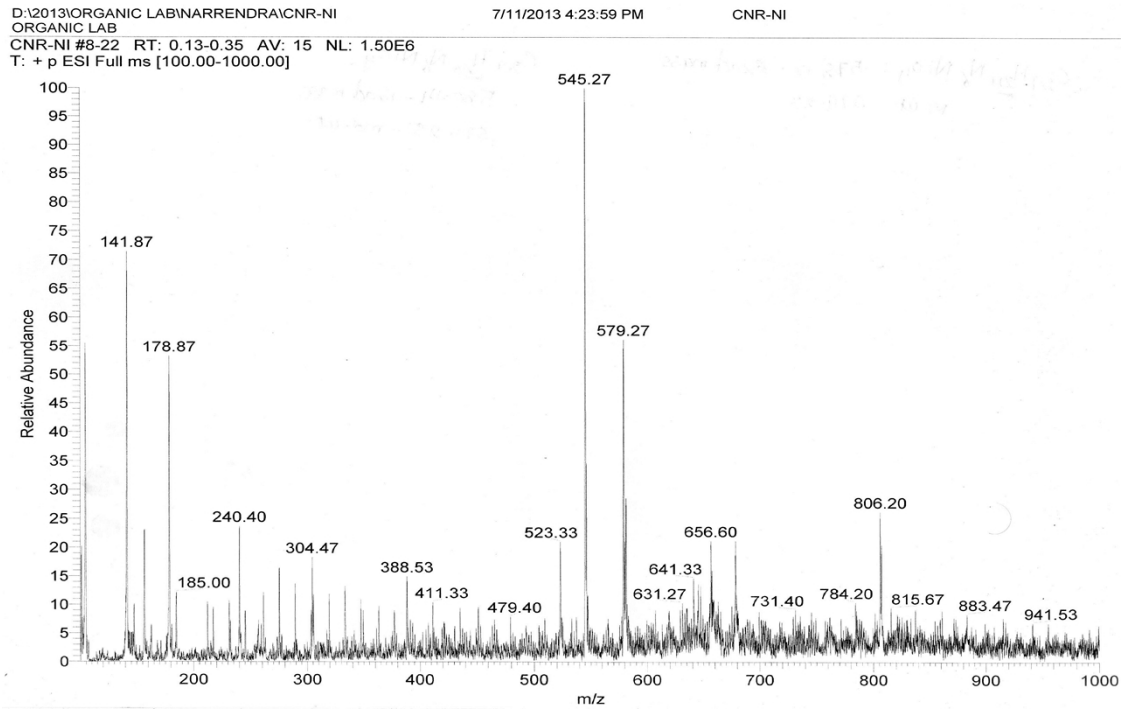


Figure S4:ESI-mass spectra of Ni(II)L.2ClO_4

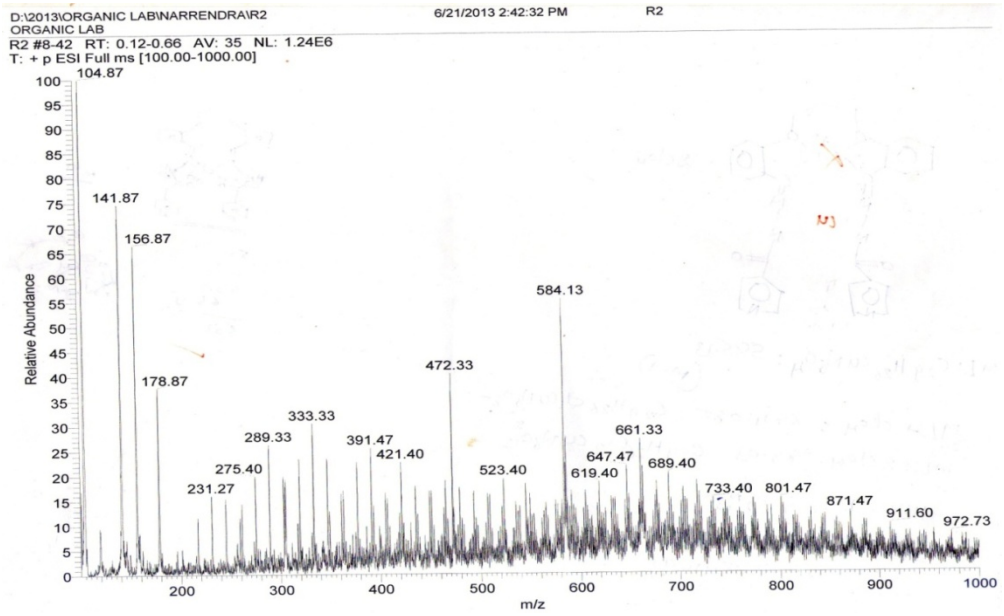


Figure S5:ESI-mass spectra of **Cu(II)L.2ClO$_4$**

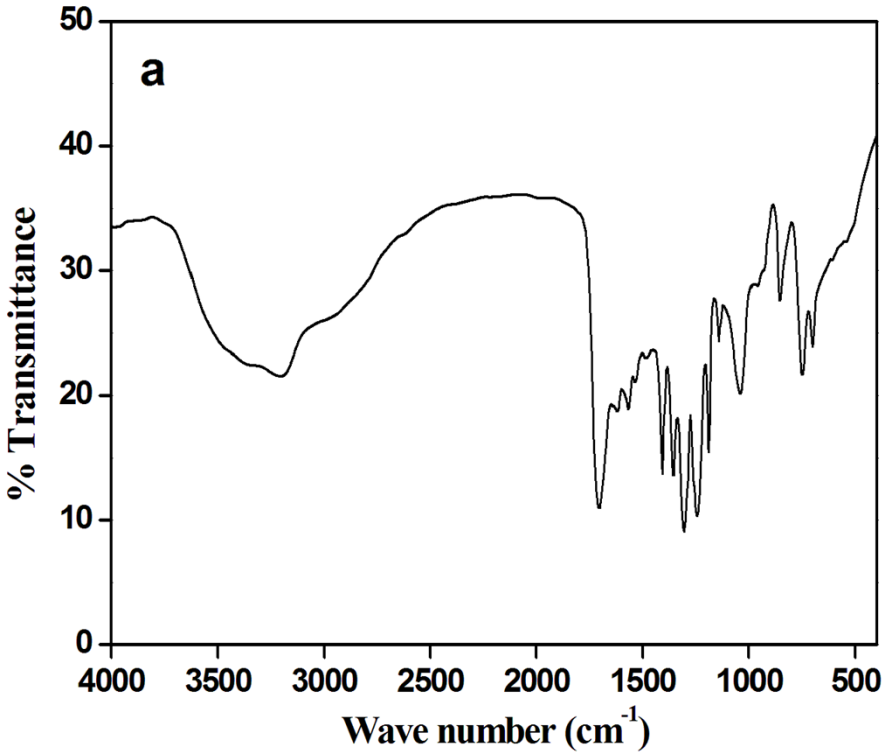


Figure S6: FTIR spectra of the SAL

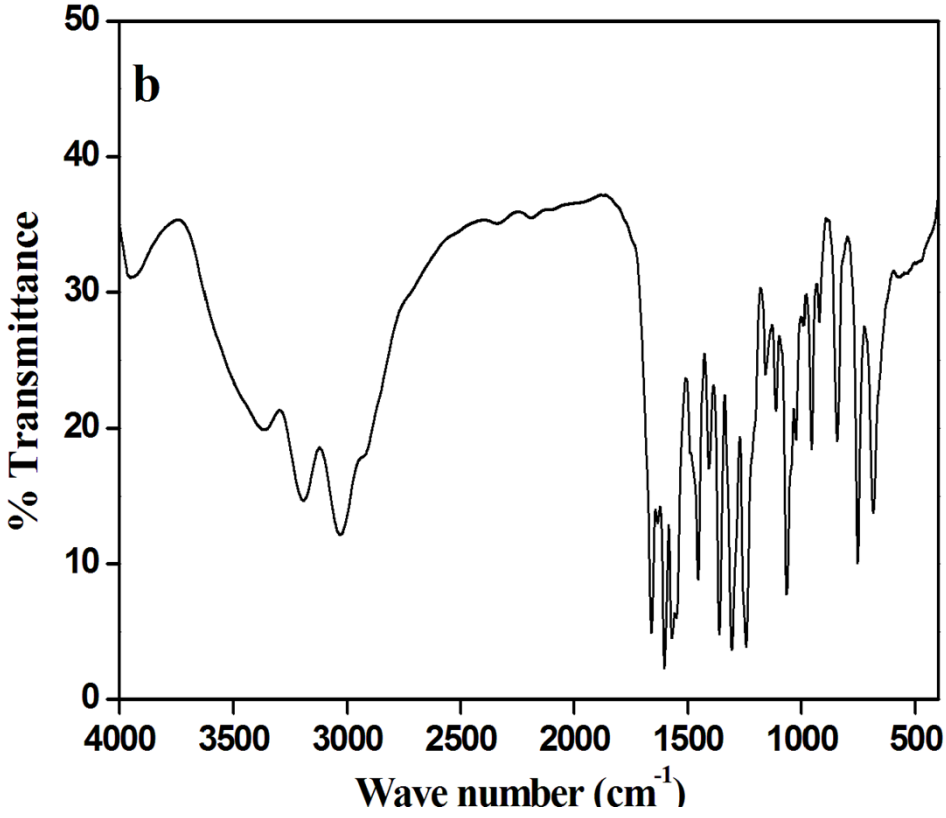


Figure S7:FTIR spectra of the H_2L

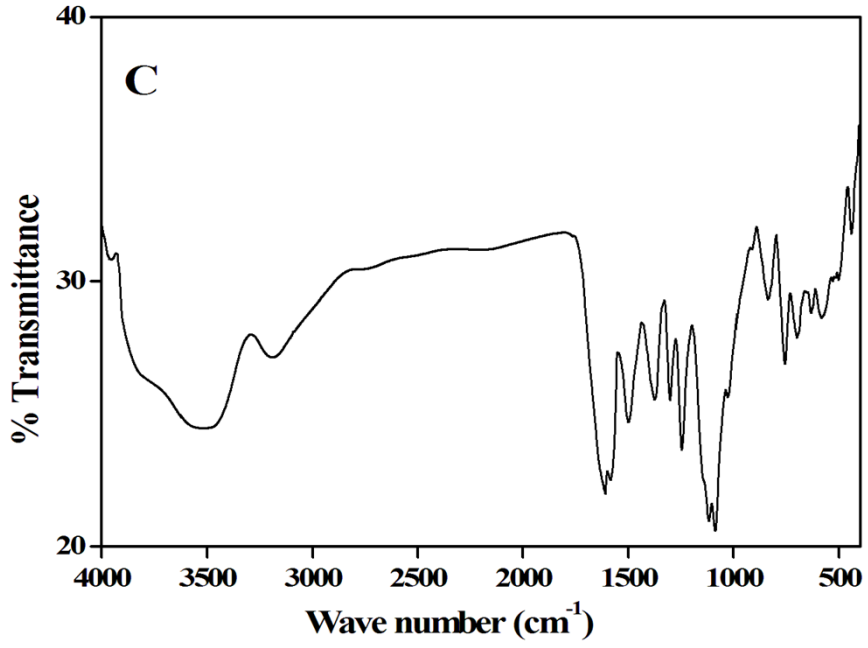


Figure S8: FTIR spectra of the Ni(II)L.2CLO_4

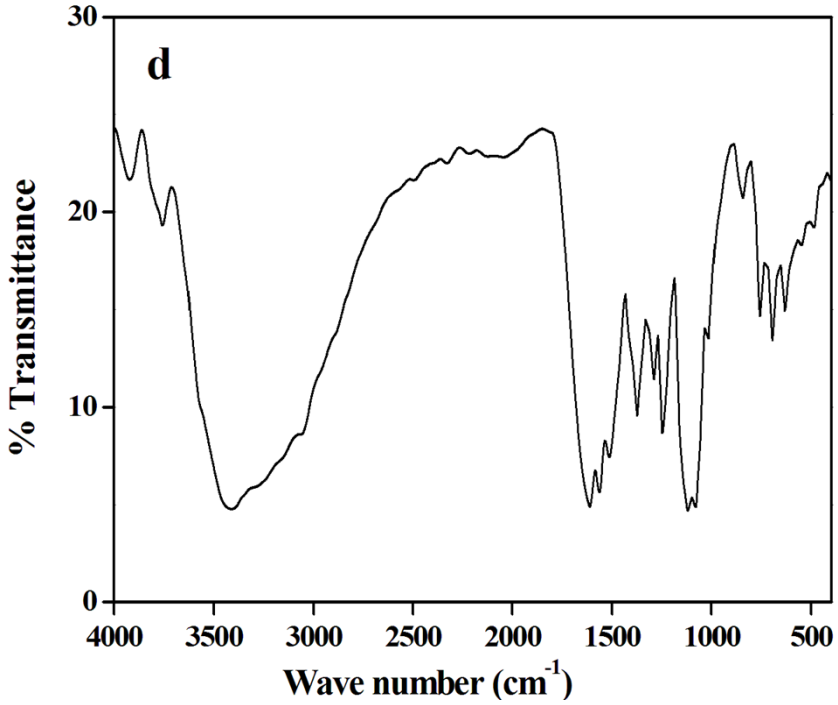


Figure S9: FTIR spectra of Cu(II)L.2ClO_4

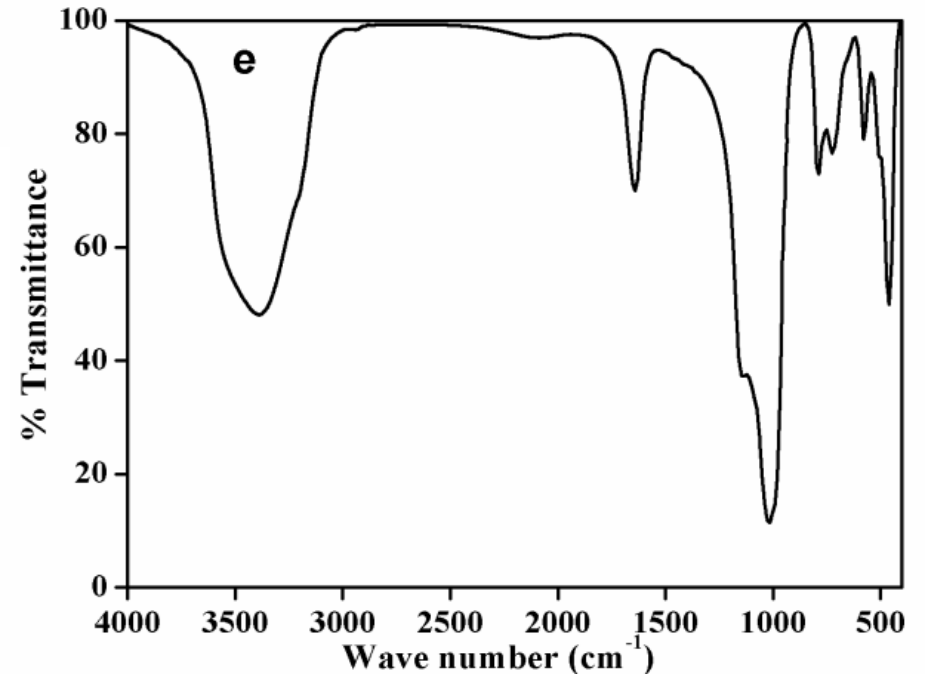


Figure S10: FTIR spectra of the Na-Y

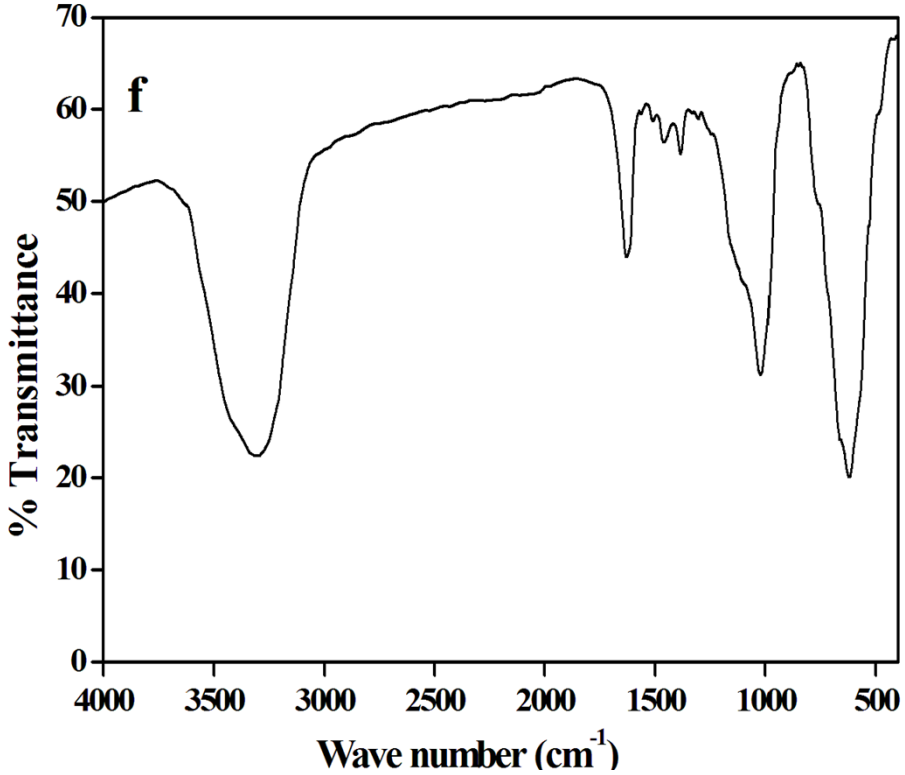


Figure S11: FTIR spectra of the Ni(II)L-Y

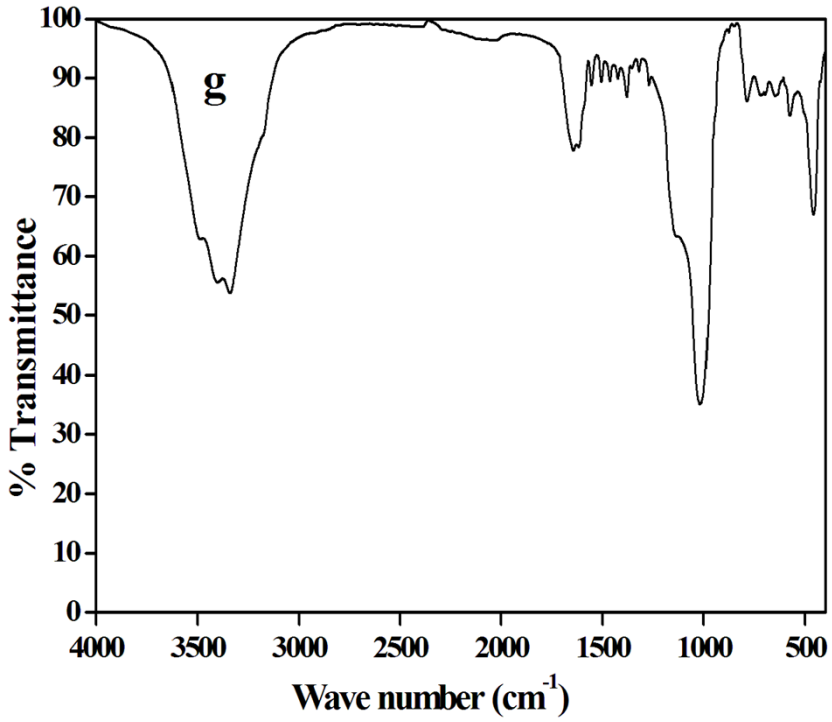


Figure S12: FTIR spectra of the Cu(II)L-Y

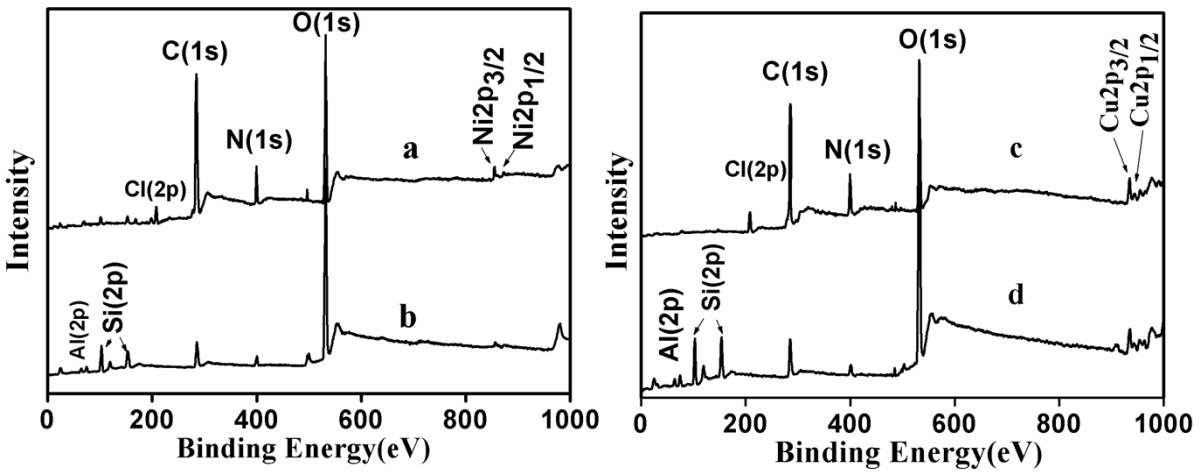


Figure S13:(a-d): XPS patterns (survey image) of the (a) Ni(II)L.2ClO_4 (b) Ni(II)L-Y (c) Cu(II)L.2ClO_4 and (d) Cu(II)L-Y

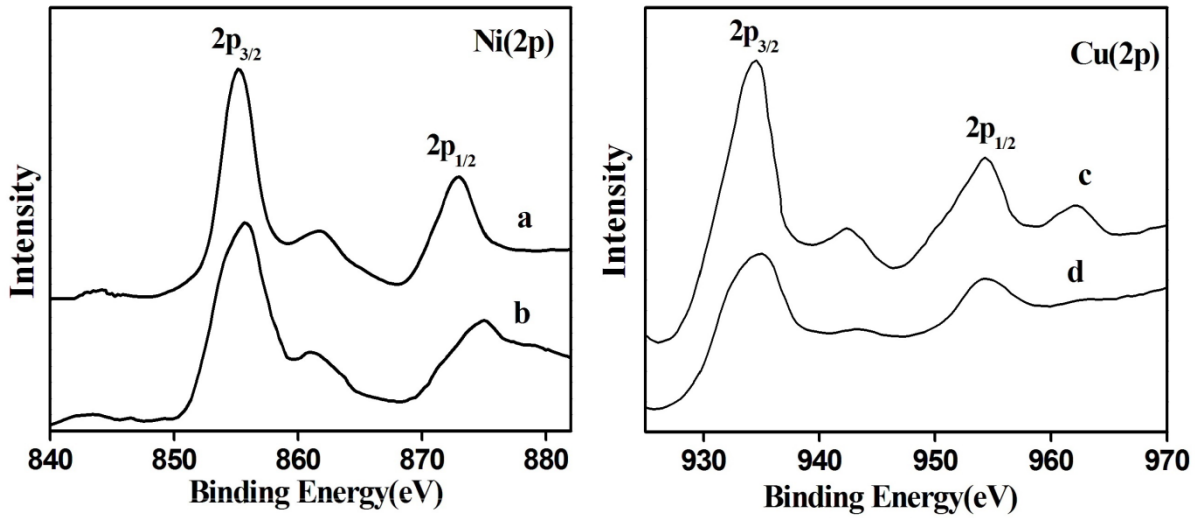


Figure.S14(a-d):M(II)($2P_{3/2}$) patterns of the (a) Ni(II)L.2ClO_4 (b) Ni(II)L-Y (c) Cu(II)L.2ClO_4 and (d) Cu(II)L-Y

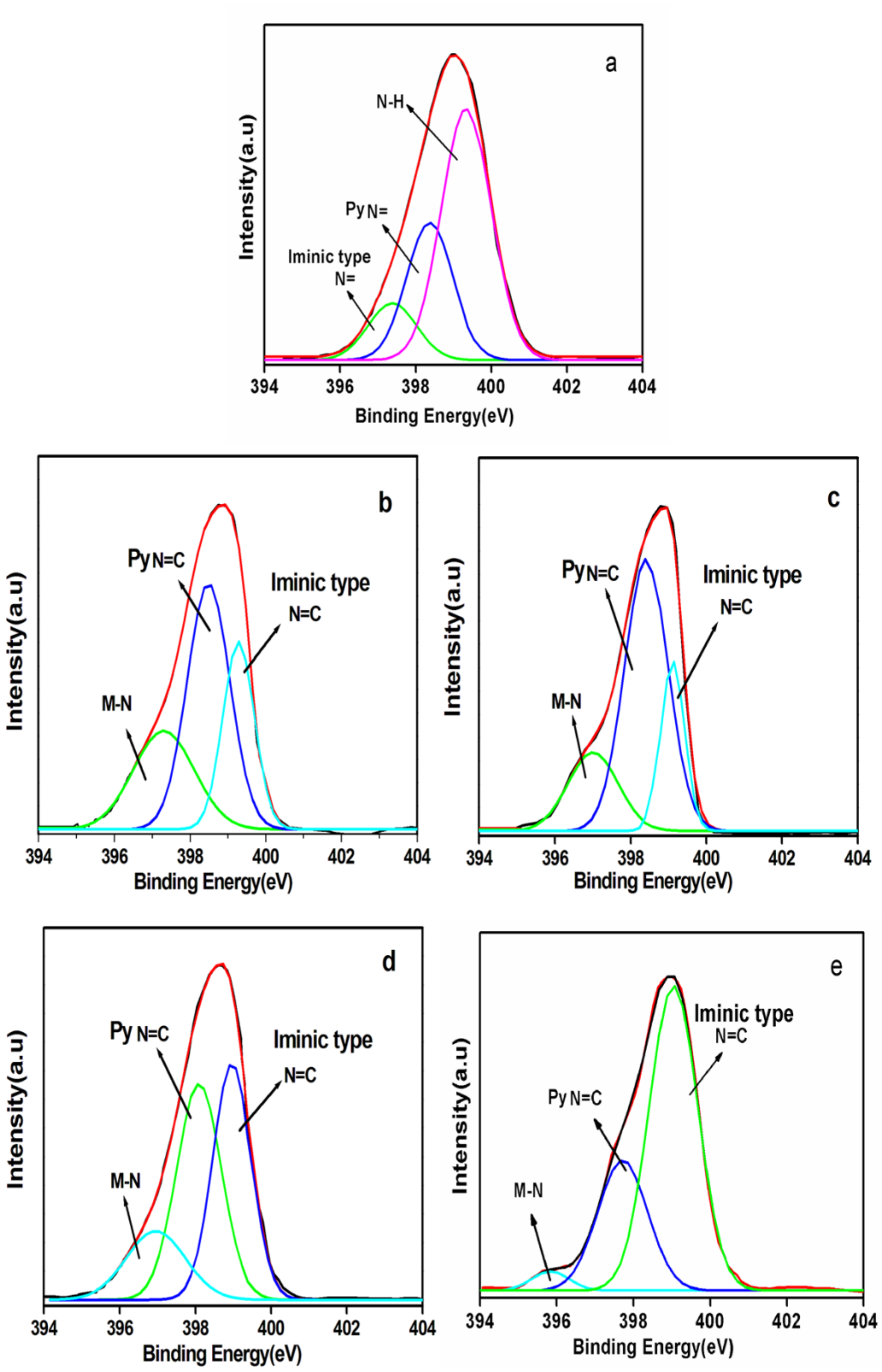
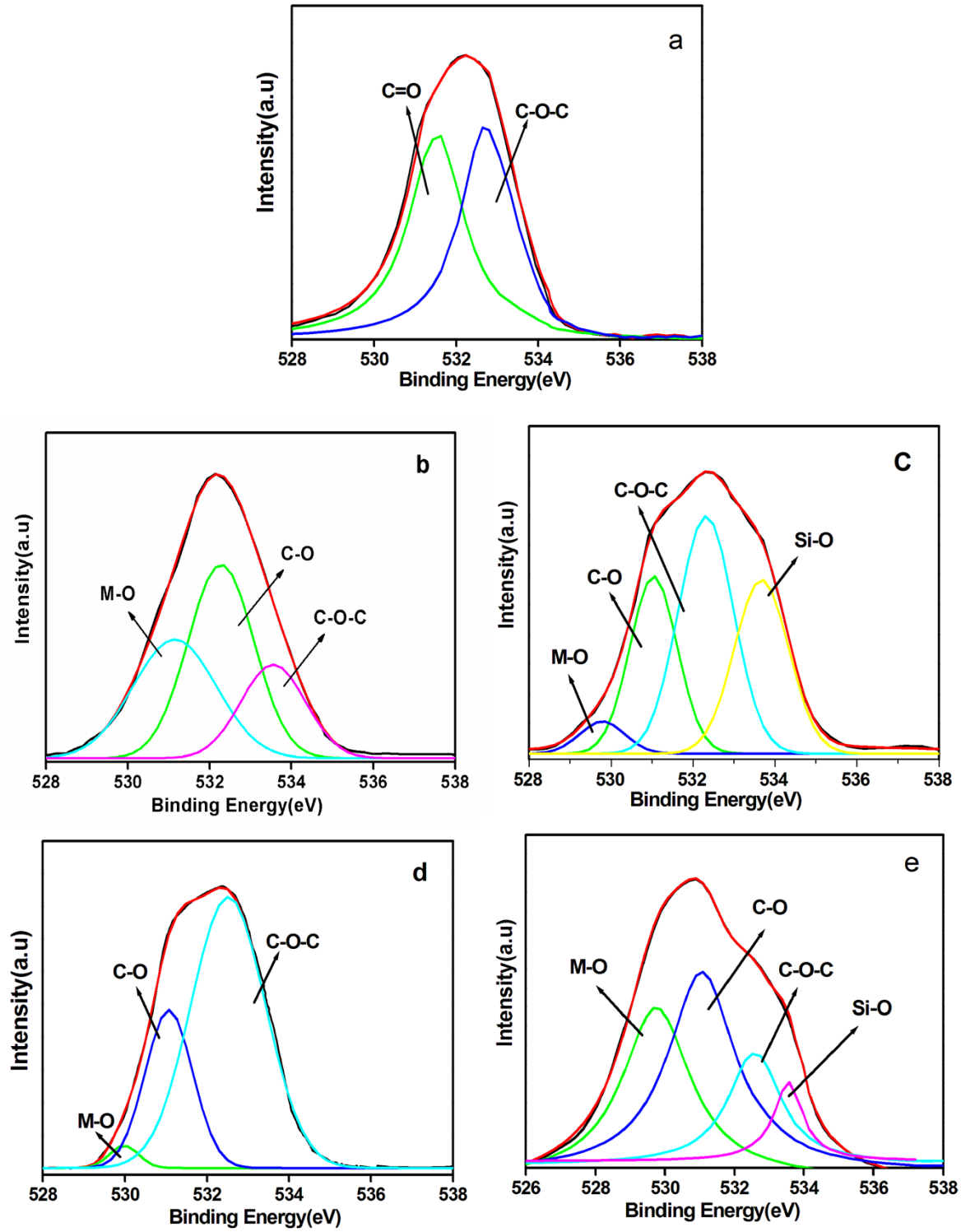


Figure.S15(a-e): Deconvoluted XPS of the N_{1s} region for H_2L, Ni(II)L.2CLO$_4$, Cu(II)L.2CLO$_4$, Ni(II)L-Y and Cu(II)L-Y.



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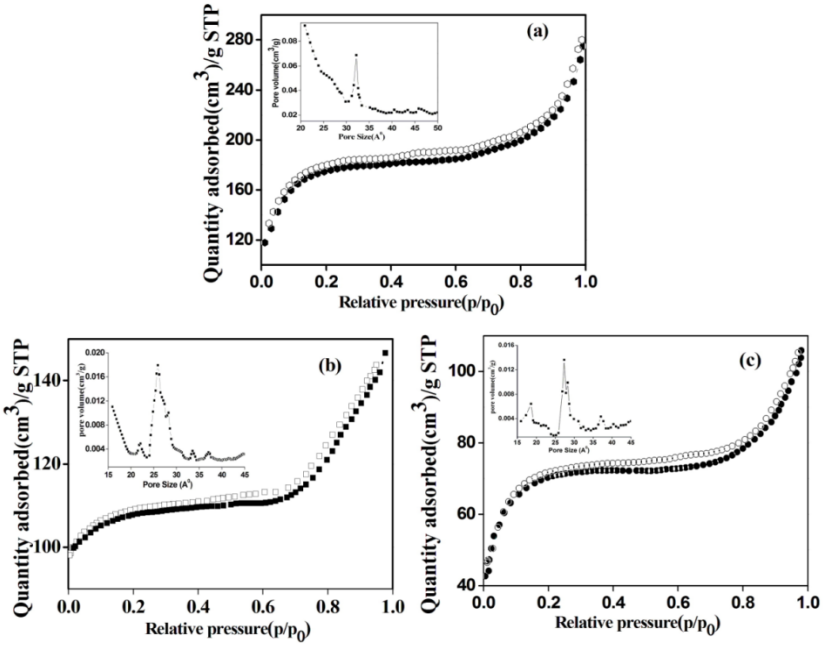
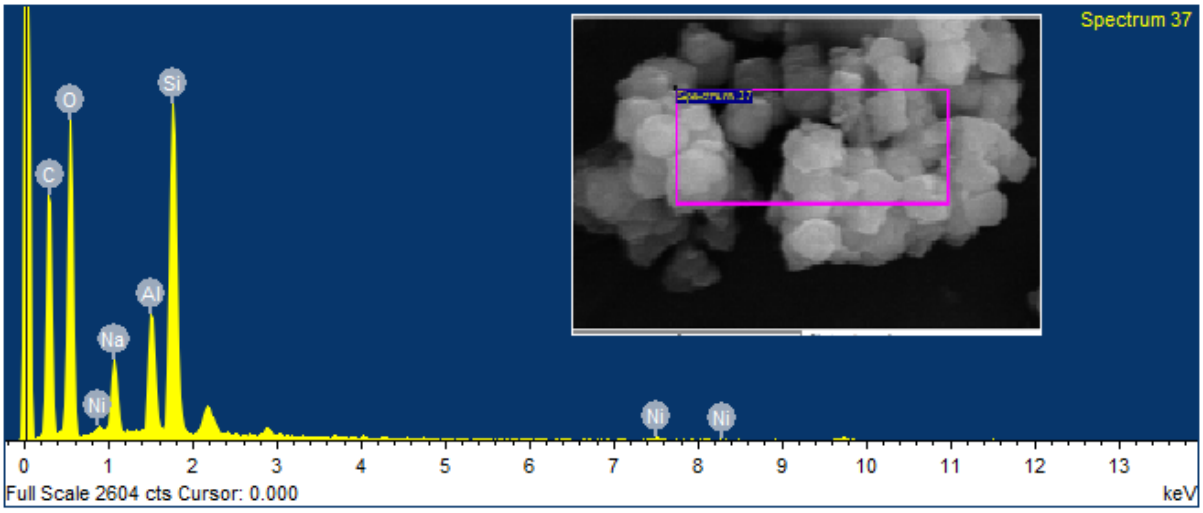


Figure: S17(a-c) N_2 isotherms of a) NaY, (b) Ni(II)L-Y and (c) Cu(II)L-Y(filled loops are absorption and unfilled loops are desorption



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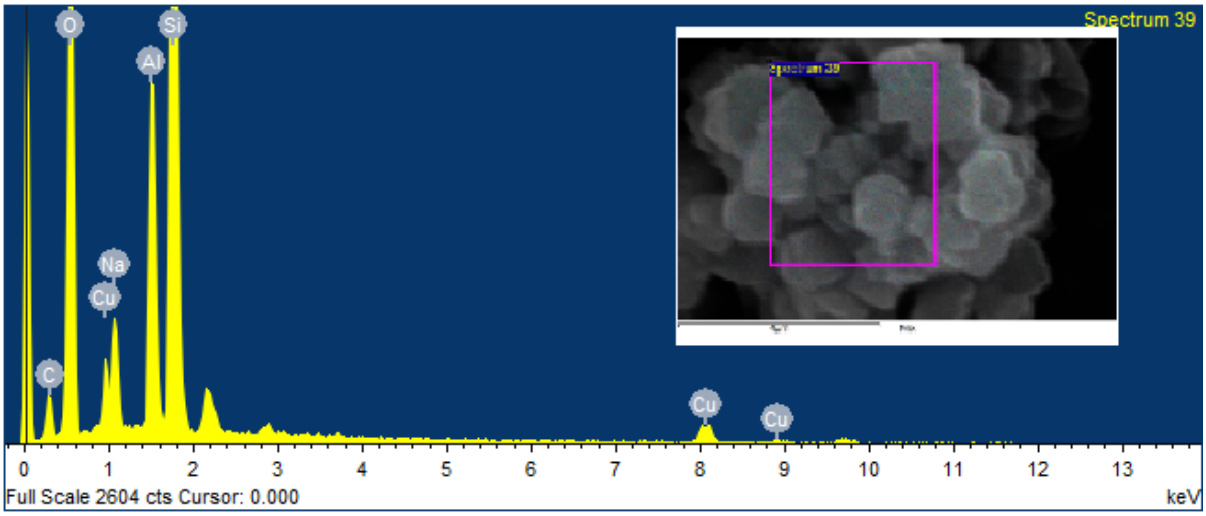
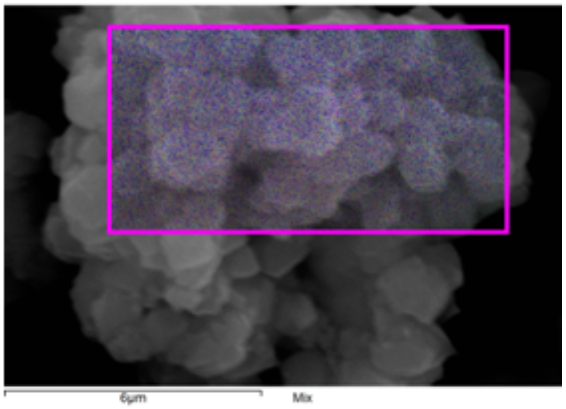


Figure 19: SEM  **EDAX of the Cu(II)L-Y**

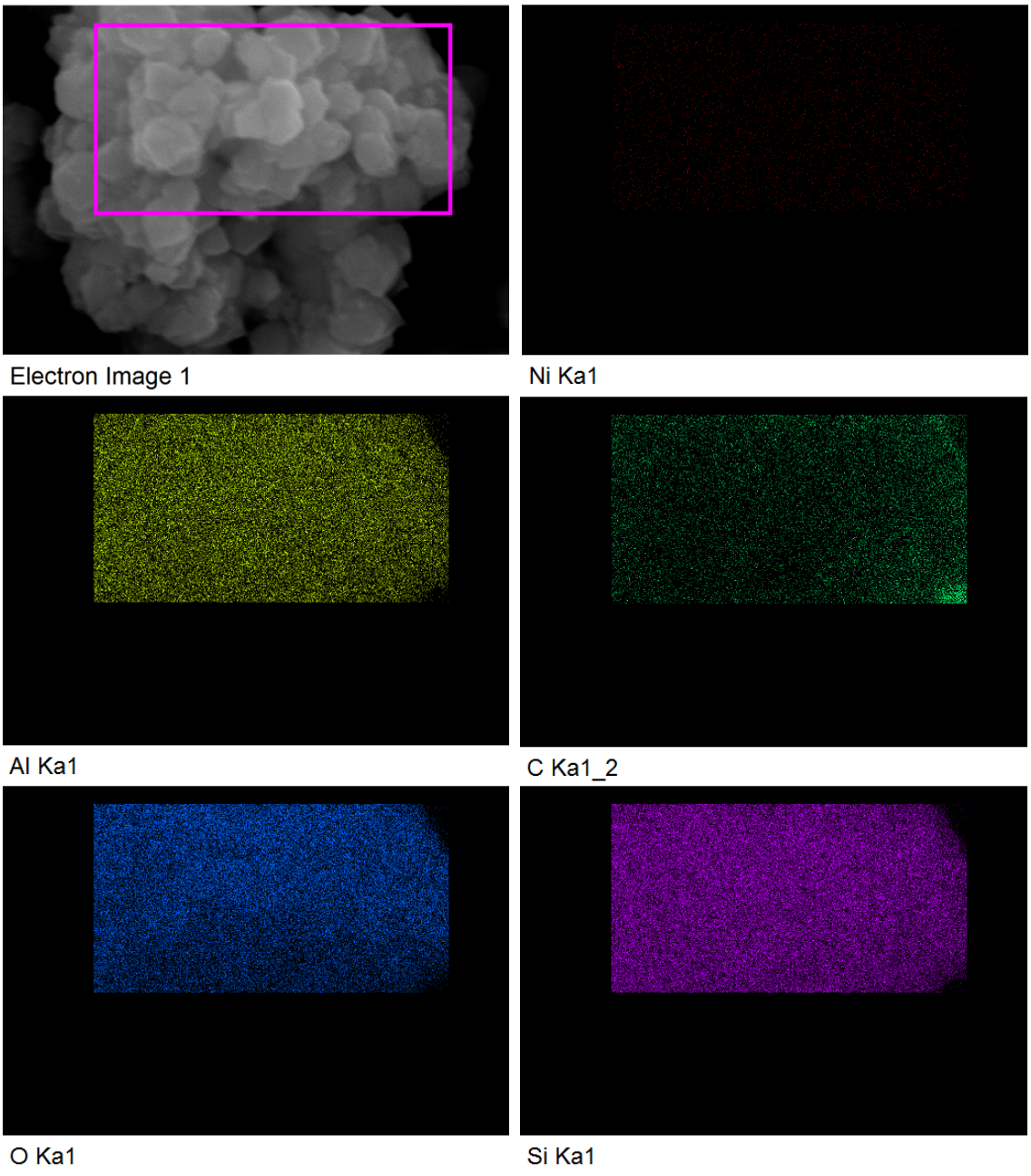
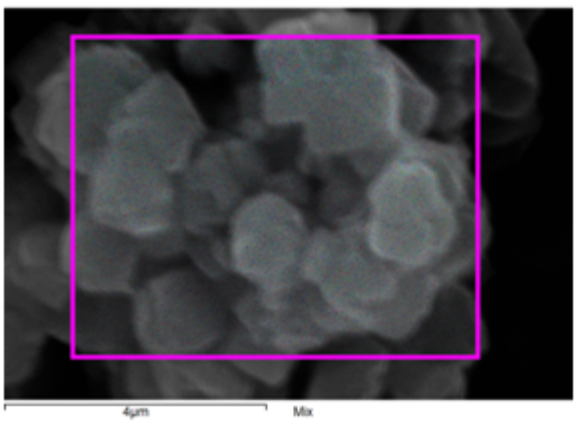


Figure S20: Image mapping studies of the Ni(II)L-Y



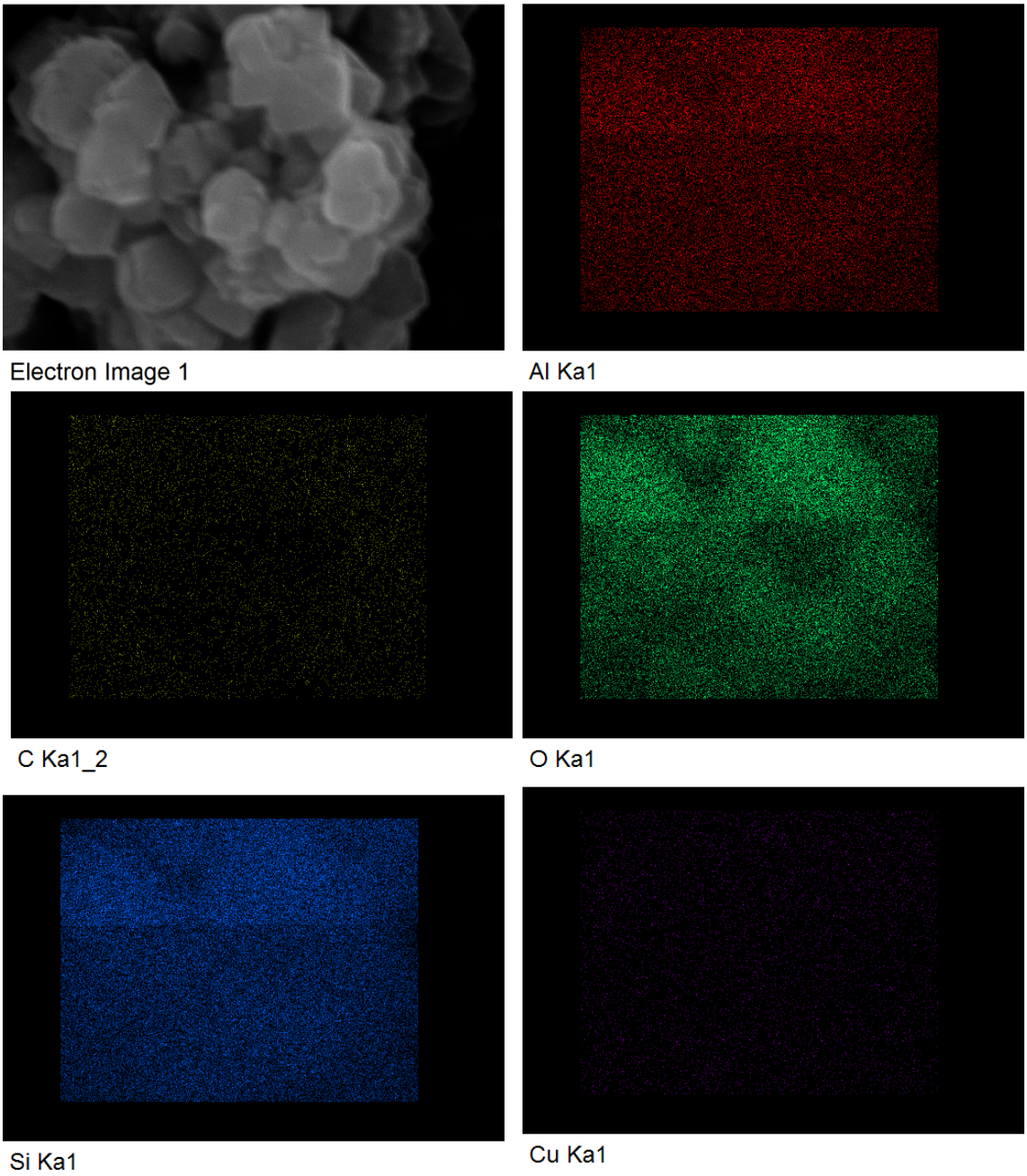


Figure S21: Image mapping studies of the Cu(II)L-Y

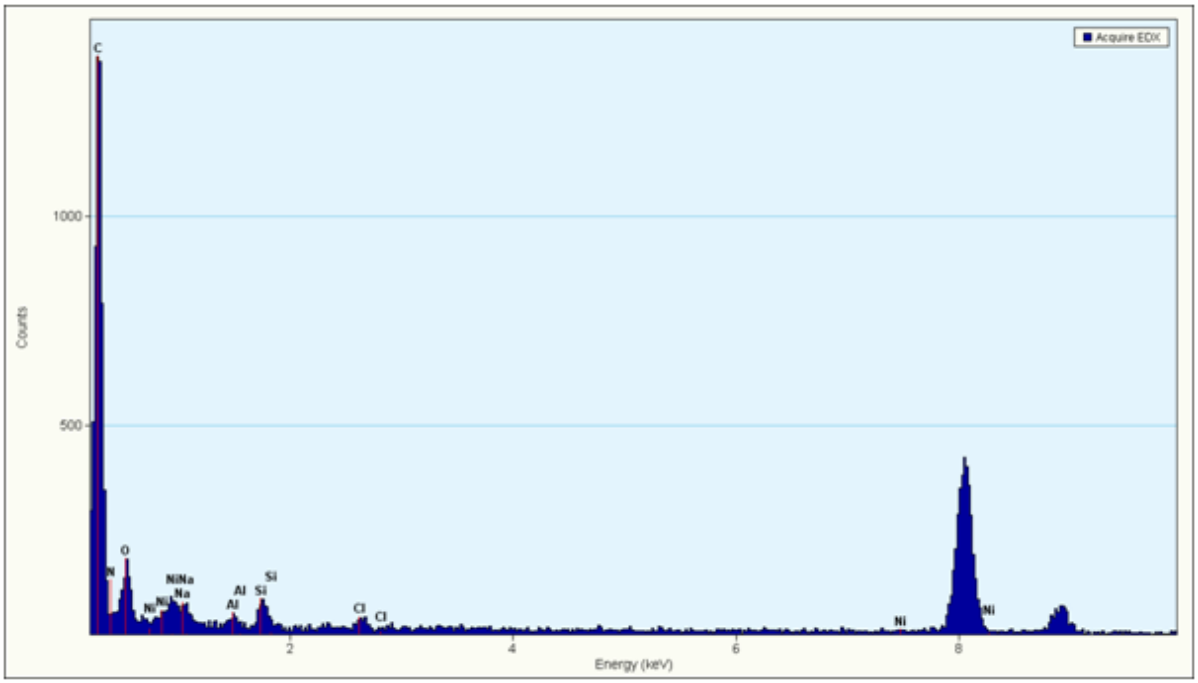


Figure S22: TEM-EDAX of the Ni(II)L-Y

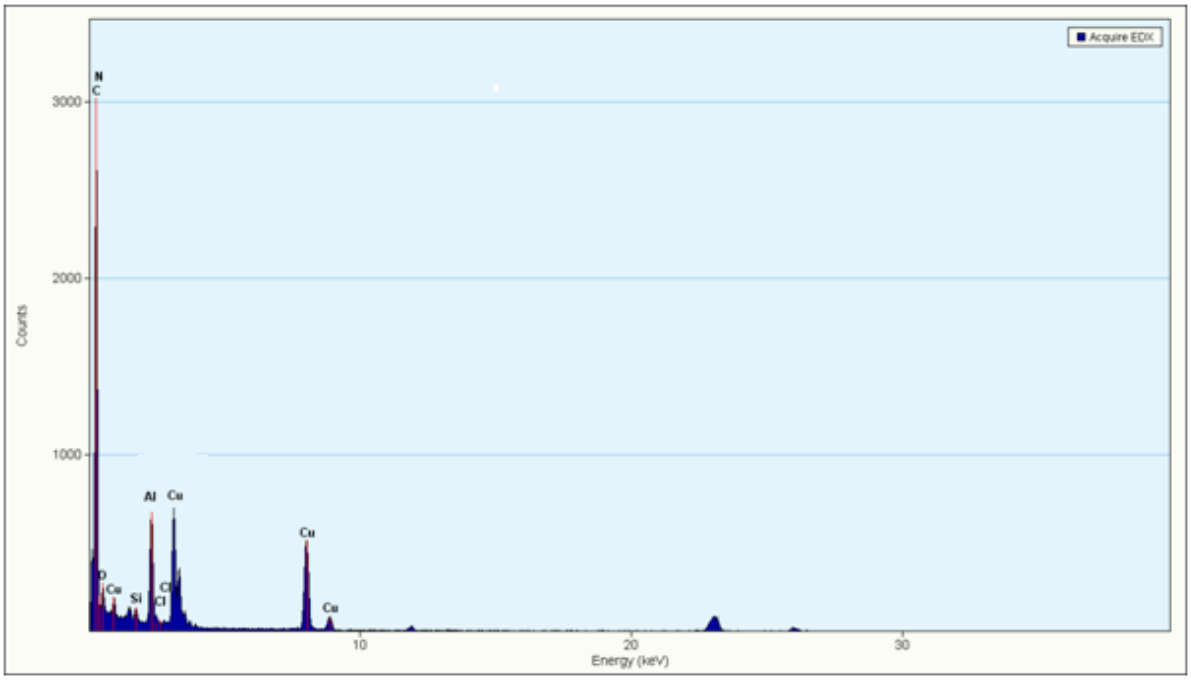


Figure S23: TEM-EDAX of the Cu(II)L-Y

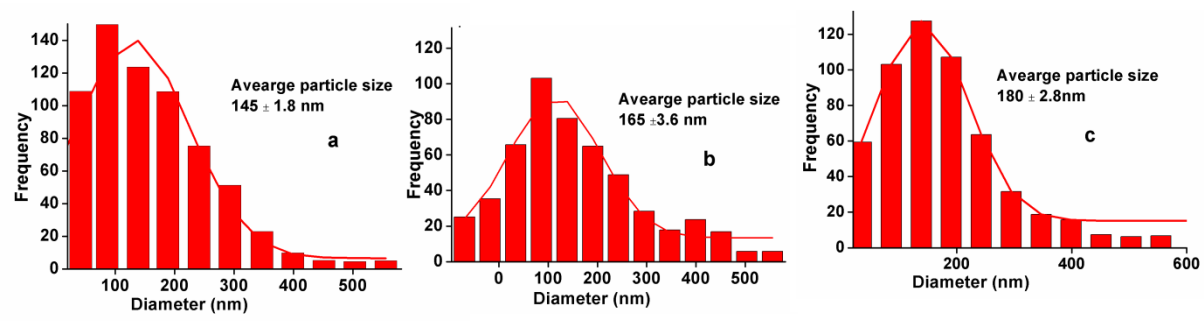


Figure S24 (a-c): The average particle size obtained from from the SEM micrograph analysis for a) NaY, b) Ni(II)L-Y and c) Cu (II)L-Y.

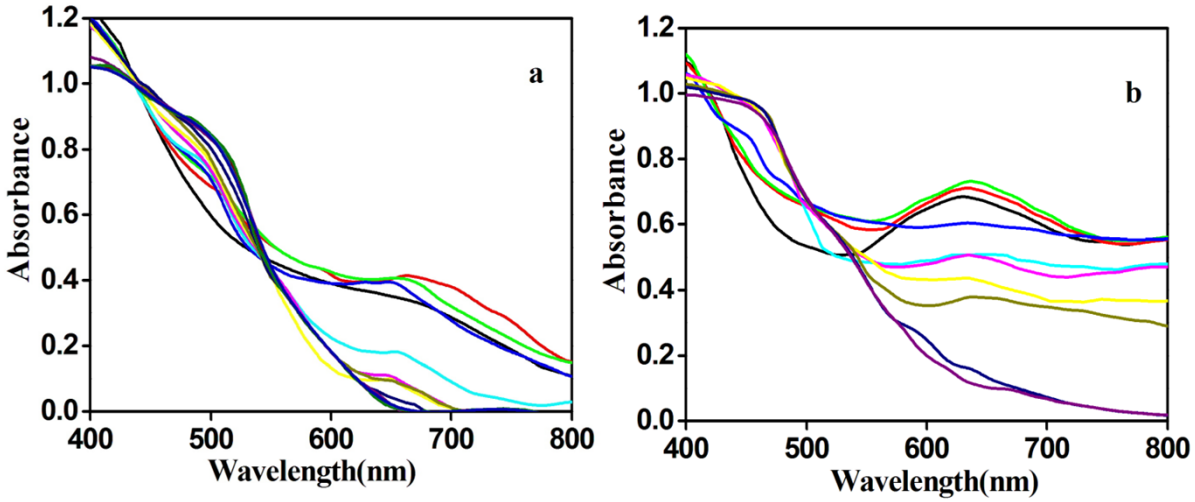


Figure S25: The absorption plots for benzhydrol oxidation (a) NaY, (b) Ni(II)L.2ClO_4, (c) Cu(II)L.2ClO_4, (d) Ni(II)L-Y and (e)Cu(II)L-Y.

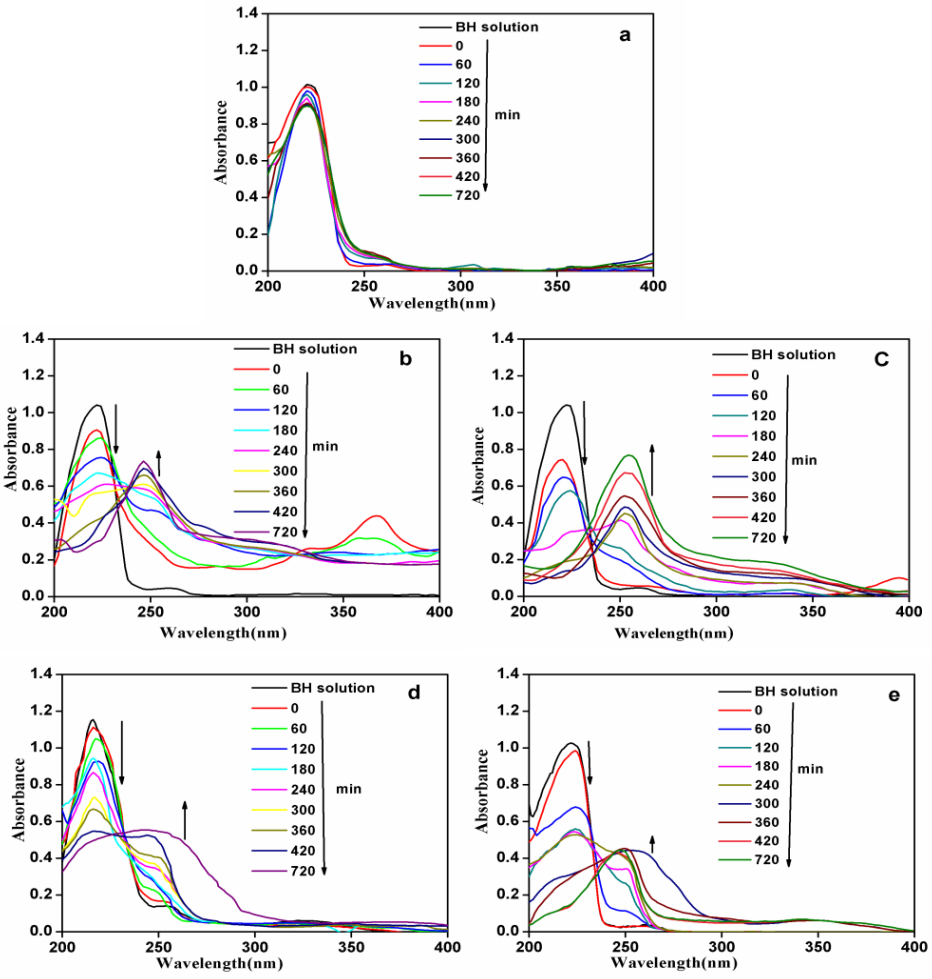


Figure S26: The absorption plots for benzhydrol oxidation (a) NaY, (b) Ni(II)L.2ClO_4, (c) Cu(II)L.2ClO_4, (d) Ni(II)L-Y and (e)Cu(II)L-Y.

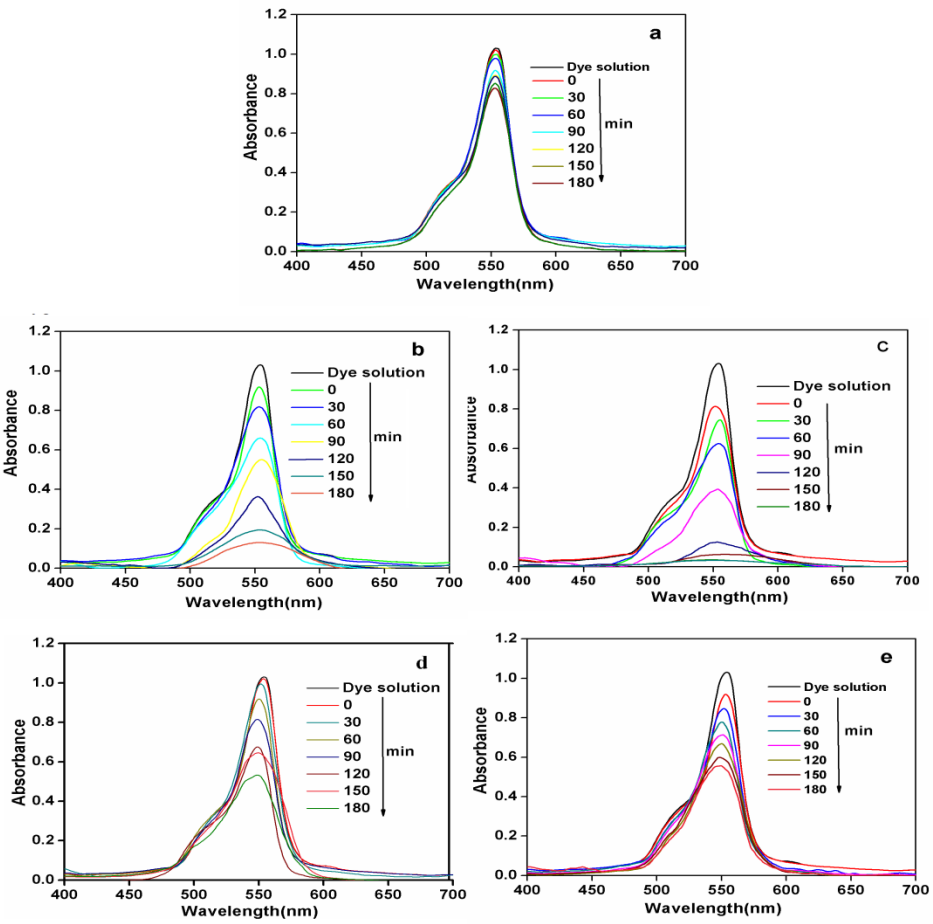


Figure 27: The absorption plots showing the photo degradation of RhB in the presence of (a) NaY, (b) Ni(II)L-Y, (c) Cu(II)L-Y, (d)Ni(II)L.2ClO_4 and (e)Cu(II)L.2ClO_4 under UV irradiation.

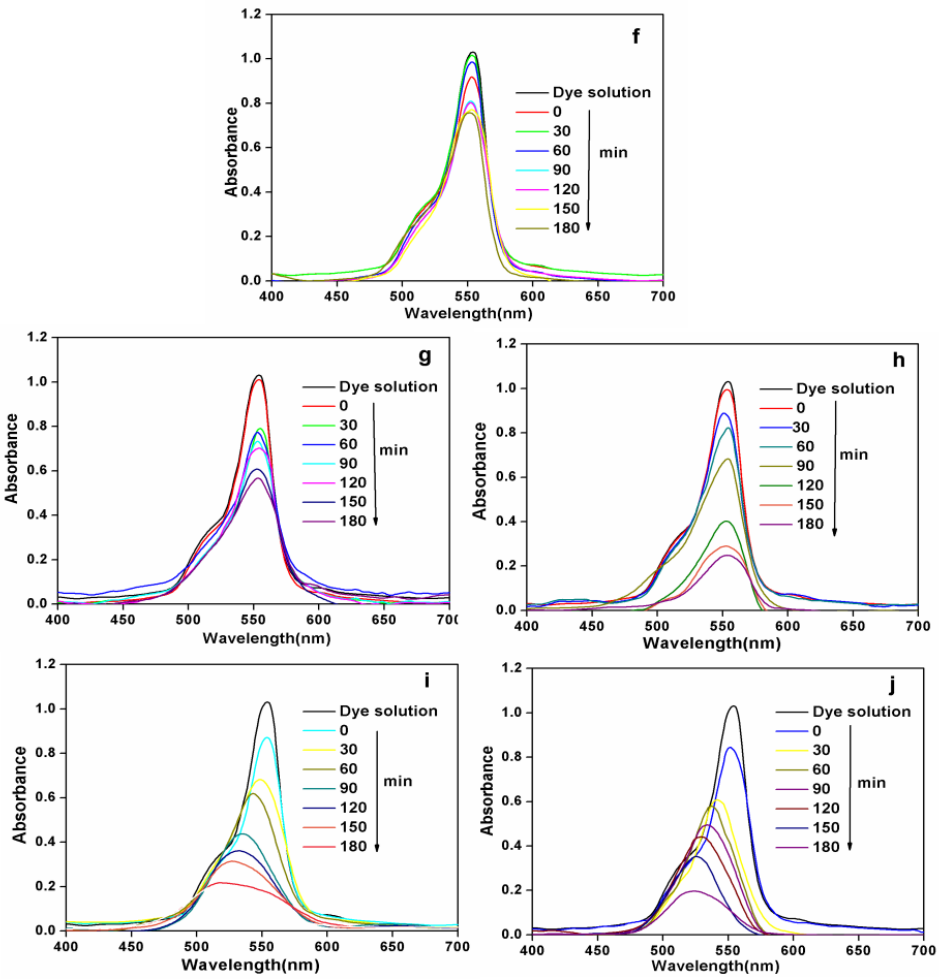


Figure 29: The absorption plots showing the photo degradation of RhB in the presence of (f) NaY, (g) Ni(II)L-Y, (h) Cu(II)L-Y, (i)Ni(II)L.2ClO_4 and (j)Cu(II)L.2ClO_4 under visible/H_2O_2 irradiation.

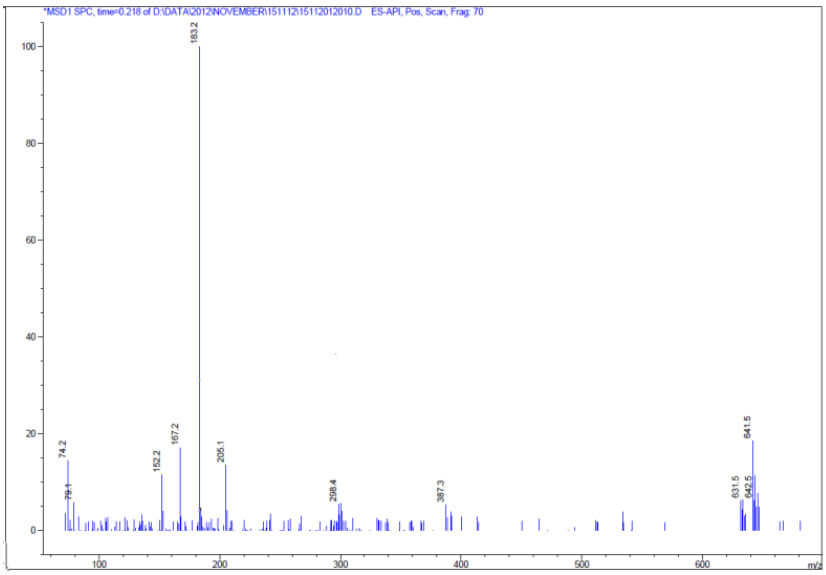


Figure S29: LC-MS spectra of the benzhydrol oxidation products encapsulated complexes

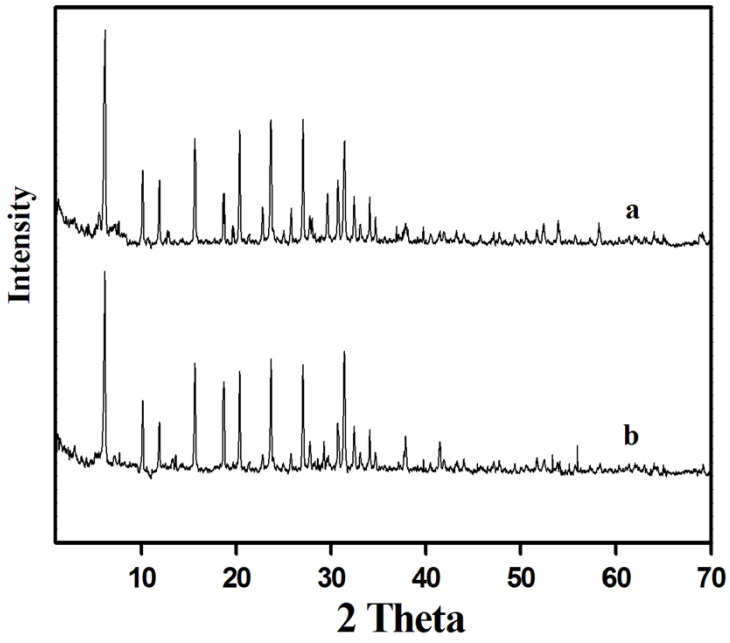


Figure S30:After reaction the recovered catalyst (a) Ni(II)L-Y and (b) Cu(II)L-Y in BH oxidation

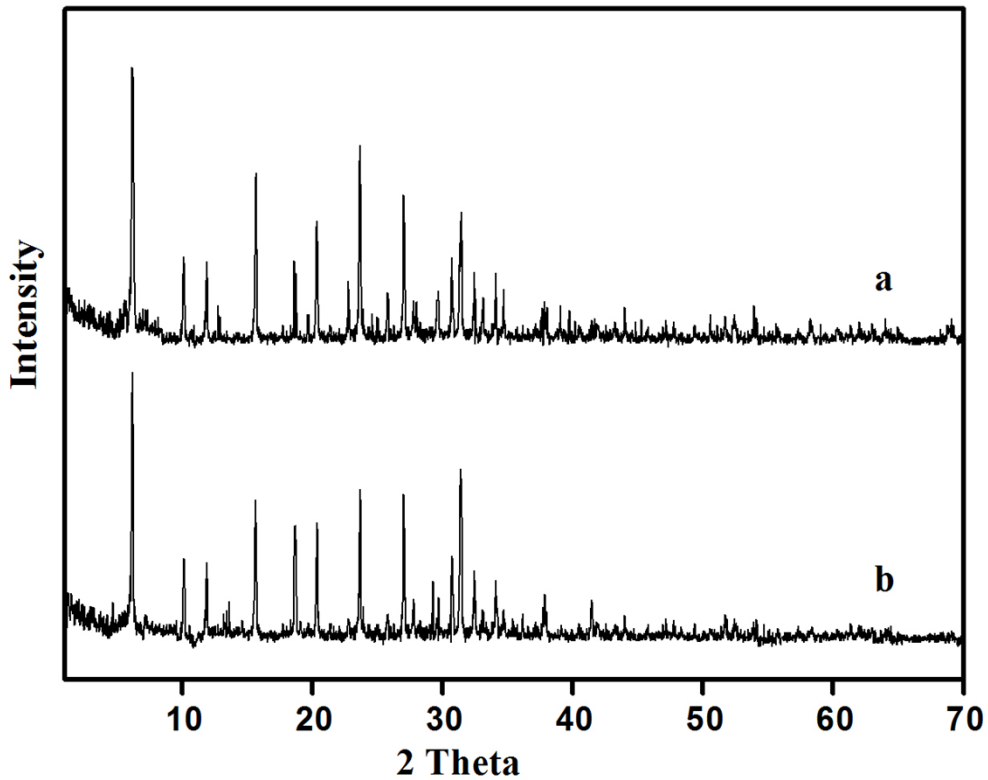


Figure S31: After reaction the recovered catalyst (a) Ni(II)L-Y and (b) Cu(II)L-Y in RhB degradation.

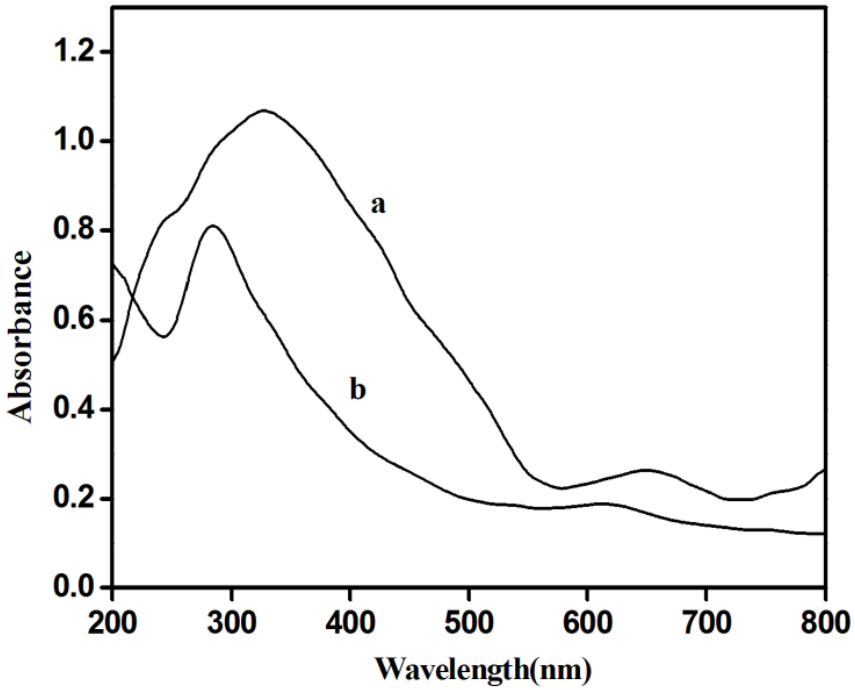


Figure S32 : Rh B degradation (a)Ni(II)L-Y and (b) Cu(II)L-Y

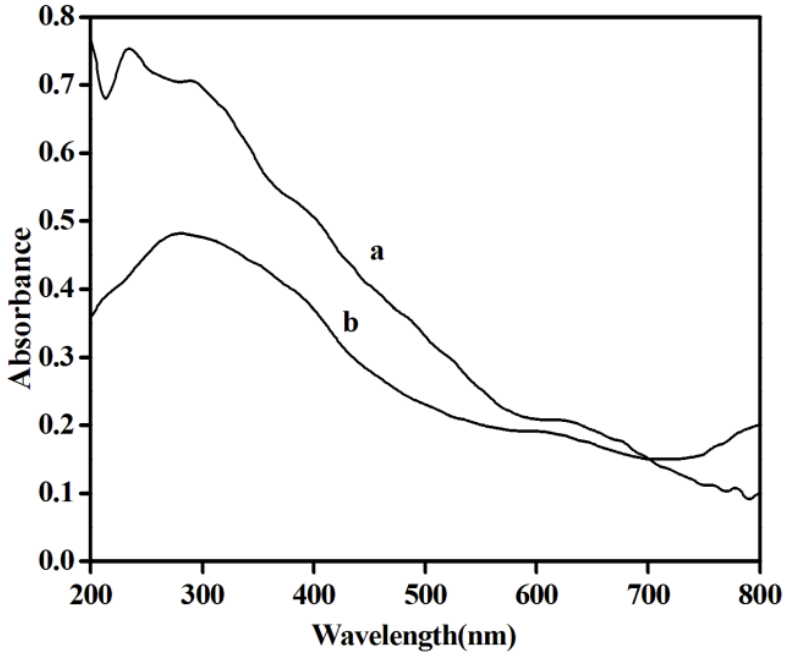


Figure S33: RhB oxidation H_2O_2 (a)Ni(II)L-Y and (b) Cu(II)L-Y

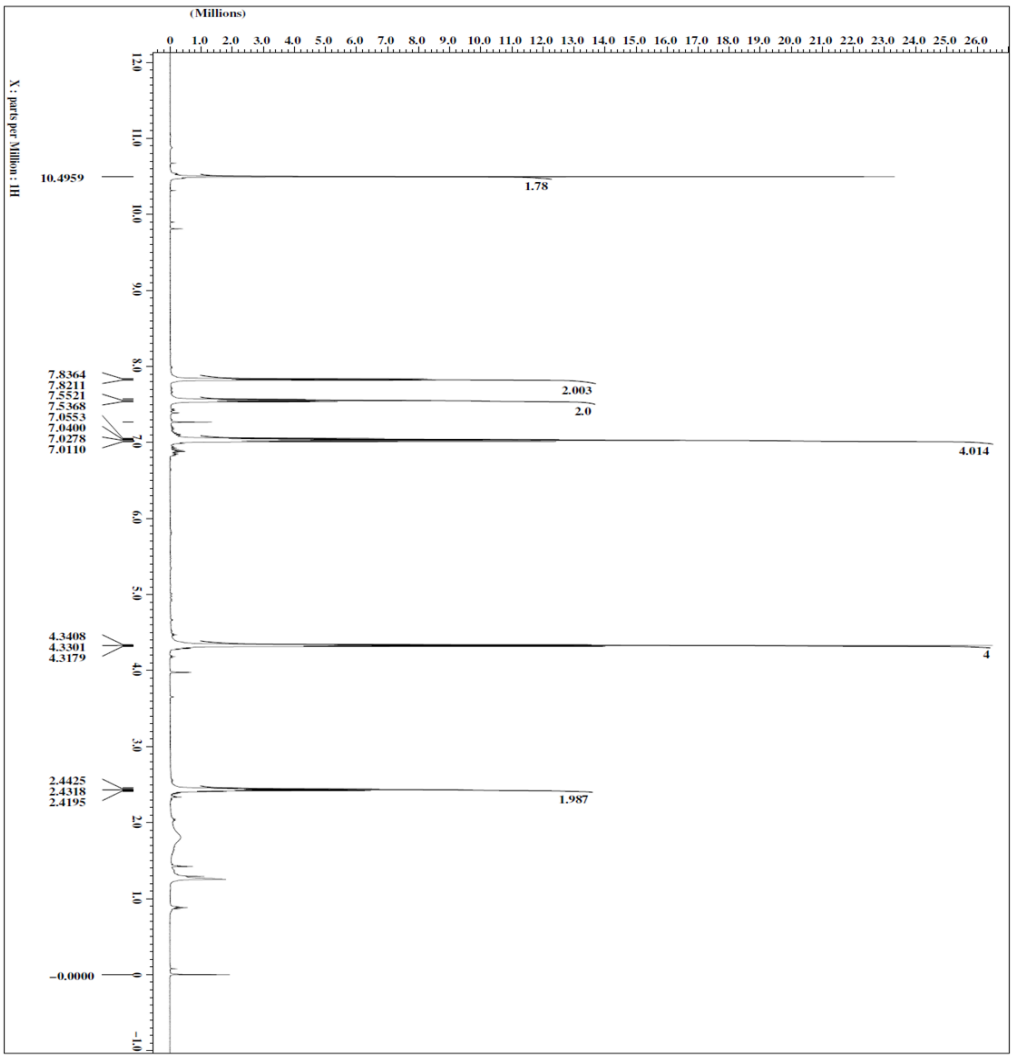


Figure S35: [1] HNMR spectral data of SAL

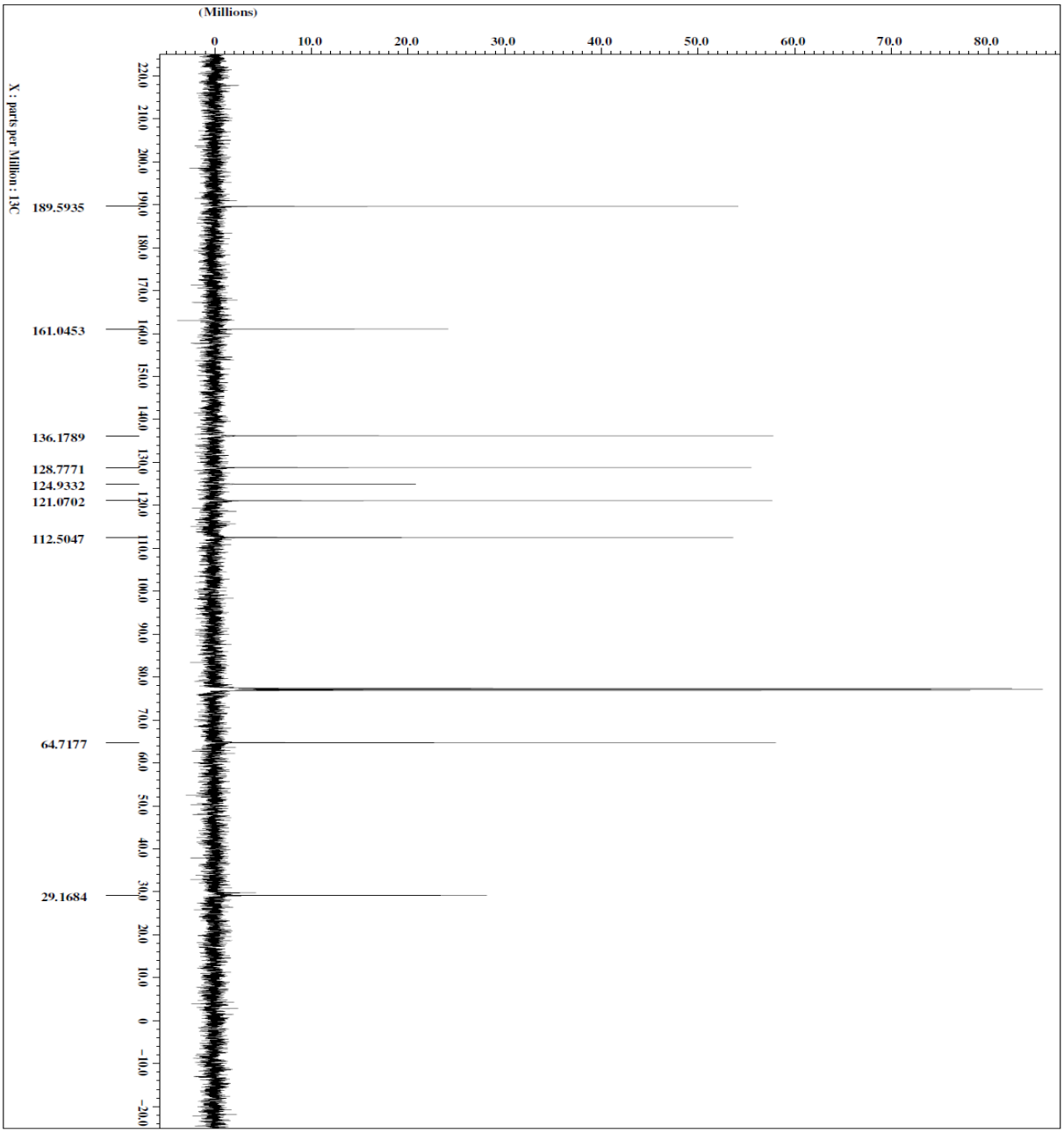


Figure S36: ^{13} CNMR spectral data of SAL

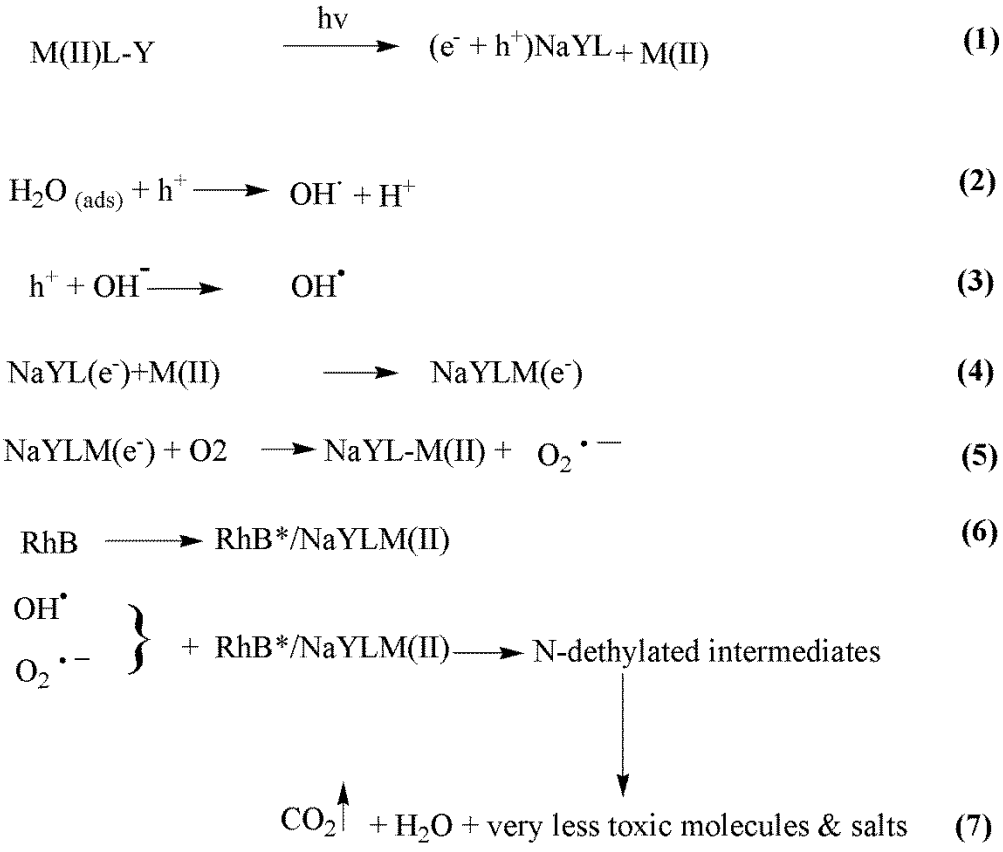


Figure S38: Proposed mechanism for the RhB degradation

Table A:

Compound	Cu(%)	Ni(%)	Si/Al	Na(%)	Si(%)	Al(%)
NaY	-	-	2.69	7.81	22.12	8.21
Ni(II)-Y	-	2.56(2.94)	2.69	5.23	22.24	8.24
Cu(II)-Y	1.92(2.02)	-	2.69	5.02	22.75	8.45
Ni(II)L-Y	-	0.79(0.95)	2.61	6.16	20.48	7.25
Cu(II)L-Y	1.02(1.10)	-	2.58	6.83	22.39	8.68

Table B:

Compound	Colour	%M
NiL $(ClO_4)_2$	Yellow	8.2(8.5)
CuL $(ClO_4)_2$	Olive green	10.3(10.42)
Ni(II)-Y	Pale green	2.5
Cu(II)-Y	Pale blue	1.9
Ni(II)L-Y	Pale yellow	0.78
Cu(II)L-Y	pale green	1.02
Ni(II)L-Y(Recovered)	Pale yellow	0.75
Cu(II)L-Y(Rcovered)	pale green	0.93