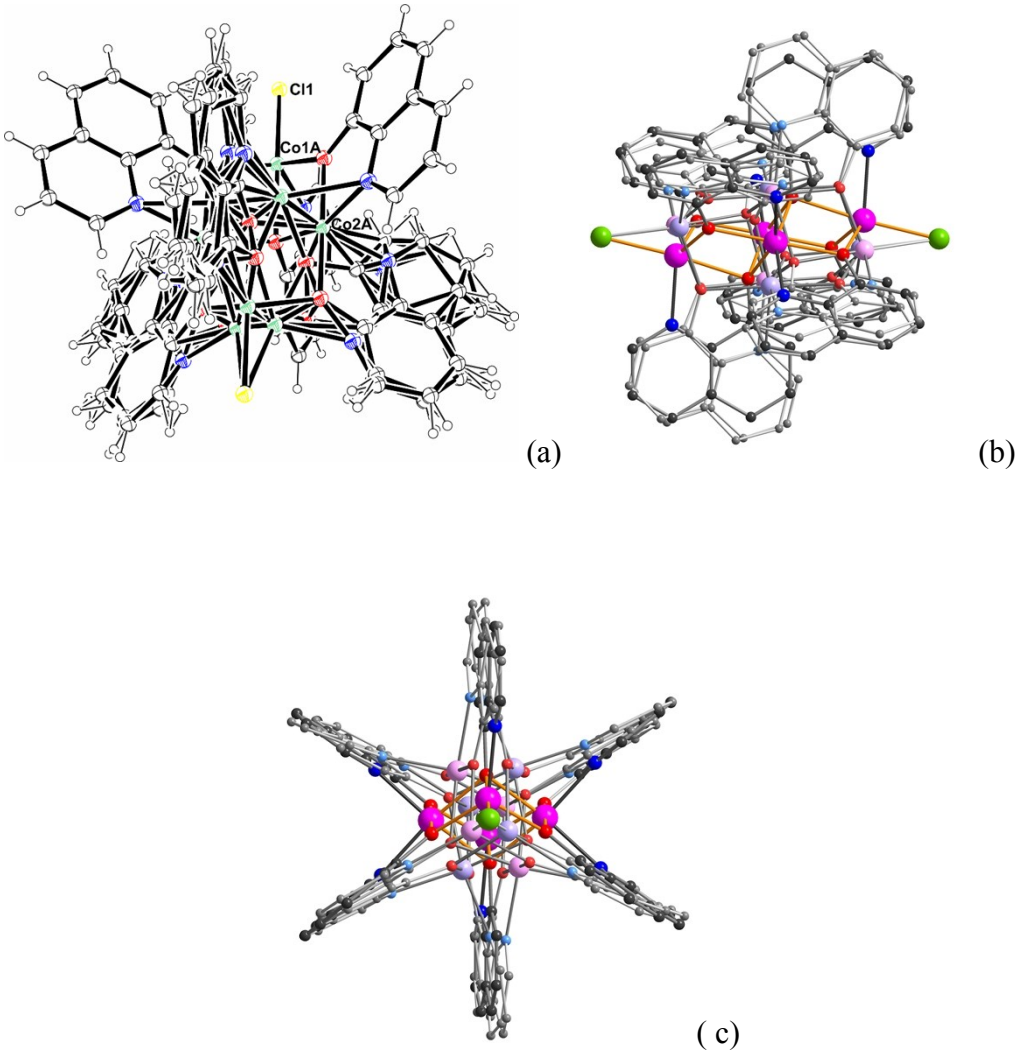
Electronic Supplementary Information

Structural and magnetic properties of oxyquinolinate clusters of cobalt(II) and manganese(II) and serendipitous intake of carbonate during synthesis



(a) (b)

(c)

Figure 1S: (a)Structure of tetra-nuclear cobalt cluster **1**; (ORTEP drawn with 30 % thermal ellipsoids, cobalt 1 is disordered and shared between three sites). (b) and (c) are views from two directions of the cluster to show disorder.

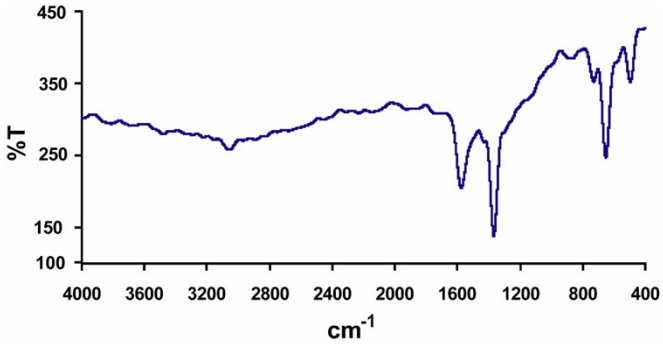


Figure 2S: Raman spectra of deca-nuclear cobalt cluster **2**.

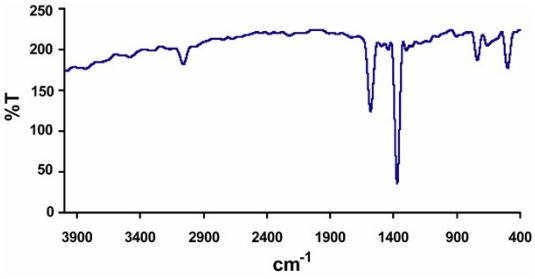


Figure 3S: Raman spectra of deca-nuclear manganese cluster **3**.

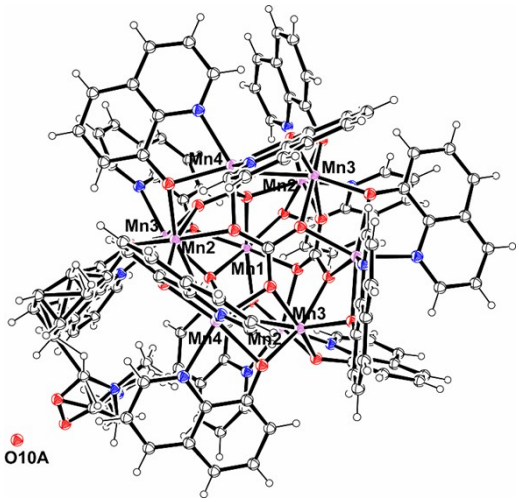


Figure 4S: Deca-nuclear core of manganese cluster **3** (drawn with 30% thermal ellipsoids).

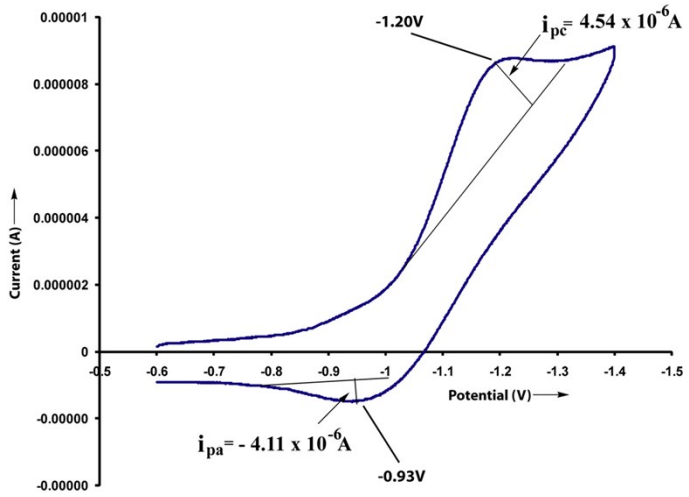


Figure 5S: Cyclic voltamogram of tetra-nuclear cobalt cluster **1** (+ ve scan, sweep rate 100mV/sec, Ag/AgCl as reference electrode, 10^{-3}M in DMSO, TBAP as supporting electrolyte).

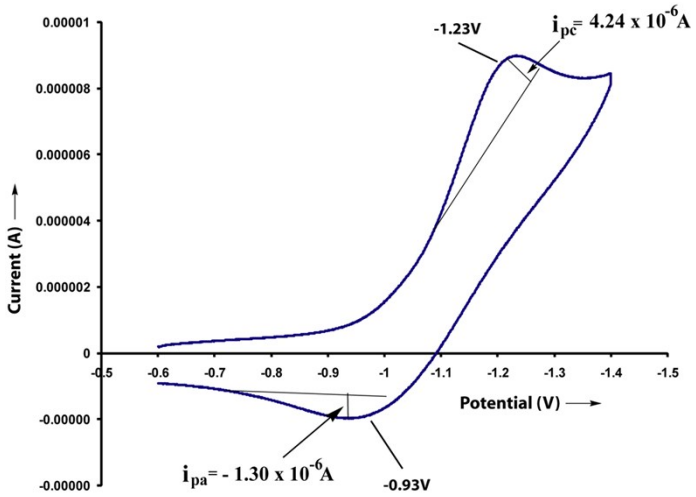


Figure 6S: Cyclic voltamogram of deca-nuclear cobalt cluster **2** (+ve scan, sweep rate 100 mV/sec, Ag/AgCl as reference electrode, 10^{-3}M in DMSO, TBAP as supporting electrolyte).

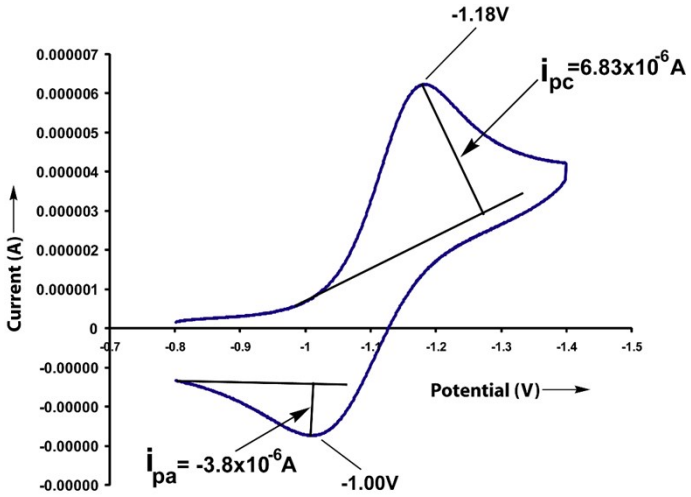


Figure 7S: Cyclic voltamogram of deca-nuclear manganese cluster **3** (+ve scan, sweep rate 100mV/sec, Ag/AgCl as reference electrode, 10^{-3}M in DMSO, TBAP as supporting electrolyte).

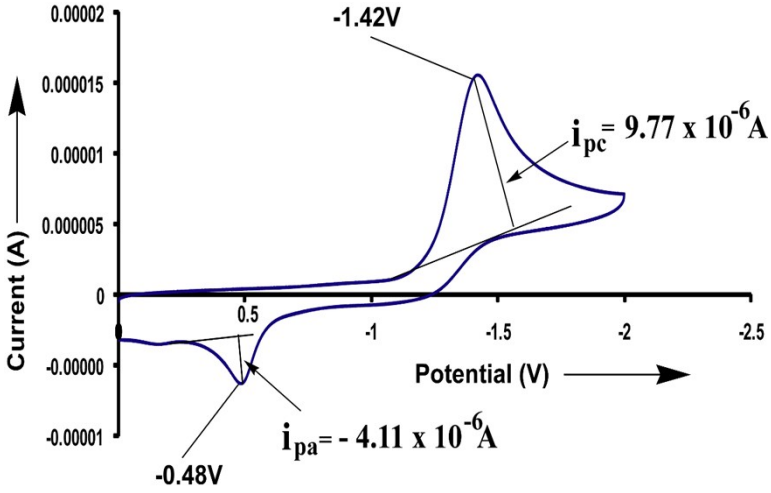


Figure 8S: Cyclic voltamogram of 8-hydroxyquinoline (+ ve scan, sweep rate 100mV/sec, Ag/AgCl as reference electrode, 10^{-3}M in DMSO, TBAP as supporting electrolyte)

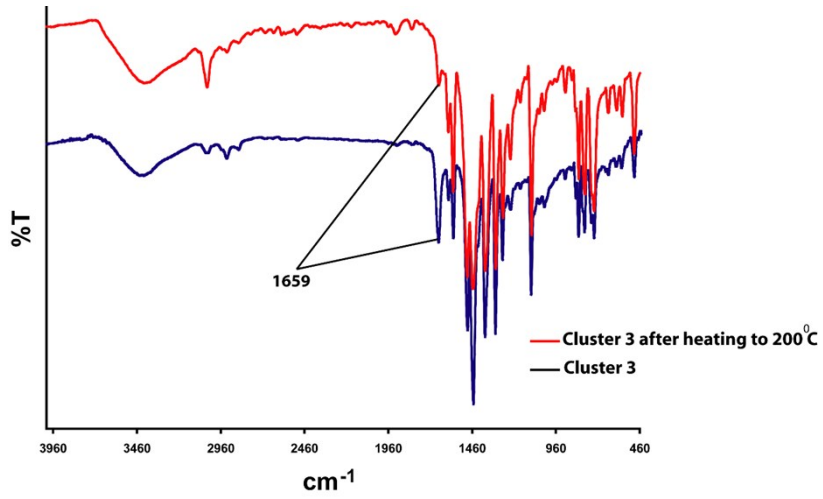


Figure 9S: FT-IR spectra (KBr) of cluster **3** (blue) and after heating cluster **3** at a temperature of 200°C.

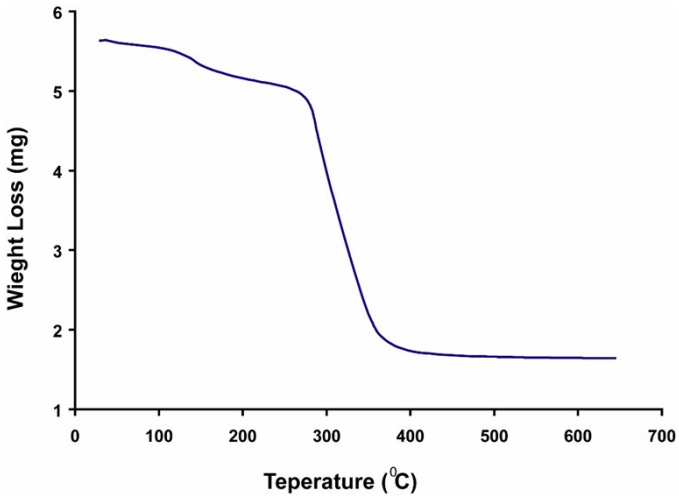


Figure 10S: Thermogravimetry of cluster **2** showing weight loss in the temperature range 135°C to 164 °C due to loss of water and DMF (Experimental loss = 3.51%, theoretical loss = 3.25%)

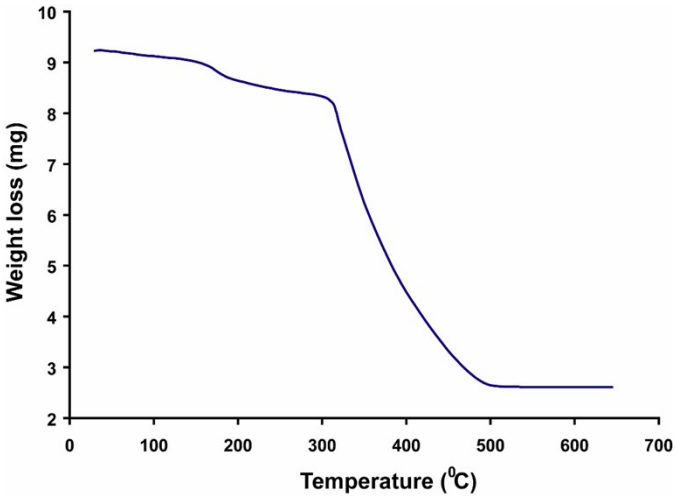


Figure 11S: Thermogravimetry of cluster **3** showing weight loss in the temperature range 144°C to 190 °C due to loss of water and DMF (Experimental loss = 3.42%, theoretical loss = 3.30%)

Table 1S: Some metal ligand bond parameters in clusters **2** and **3**

Bond lengths	Bond (Å)	Bond (Å)	Bond angles	Angle (°)	Angle (°)	Bond angles	Angle (°)	Angle (°)
	Cluster 2	Cluster 3		Cluster 2	Cluster 3		Cluster 2	Cluster 3
M1-O1	2.068(4)	2.127(5)	O1-M1-O2	77.67(16)	78.82(19)	O6-M4-N3	152.6(2)	150.6(3)
M1-O2	2.166(4)	2.245(5)	M1-O2-M2	94.04(17)	92.80(19)	O1-M2-N2	97.71(19)	97.4(2)
M2-O1	2.088(4)	2.146(5)	O1-M2-O2	78.30(16)	80.00(19)	O5-M4-O7	104.77(17)	105.9(2)
M2-O2	2.119(4)	2.175(5)	O3-M3-O6	89.91(16)	87.22(19)	O2-M2-O4	101.74(17)	103.3(2)
M2-O4	2.099(5)	2.146(6)	O1-M2-O4	176.98(17)	173.4(2)	O5-M4-O6	83.90(17)	84.19(19)
M3-O6	2.142(4)	2.218(5)	O3-M3-O8	168.68(17)	166.0(2)	O2-M2-N1	155.6(2)	154.7(3)
M3-O7	2.055(4)	2.111(5)	O1-M2-N1	79.12(19)	76.6(3)	O2-M2-N2	99.05(19)	98.2(2)
Mn4-N3	2.091(6)	2.173(9)						

Table 2S: Some metal ligand bond parameters of cluster **1**.

Bond lengths	Bond (Å) Cluster 1	Bond angles	Angle (°) Cluster 1
Co1A-Cl1	2.329(4)	Cl1-Co1A- O1A	105.6(3)
Co2A-O1A	2.065(11)	Cl1-Co1A- O2A	175.8(3)
Co2A-O2A	2.092(16)	Cl1-Co1A- O3A	106.0(4)
Co2A-N1A	2.079(14)	O1A-Co2A- O2A	78.8(4)
Co1A-N2A	2.086(11)	O1A-Co2A -N1A	79.5(5)