LIST OF FIGURES

Figure 2.1 The structural formula of (a) salen H_2 ; (b) salphen H_2	7
Figure 2.2 SalenH ₂ complexes of (a) Cr(0) and (b) Mo(IV+)	9
Figure 2.3 The structural formula of shaH ₂	9
Figure 2.4 ShaH ₂ complexes of (a) Cr; and (b) W, formed under reduced pressure	10
Figure 2.5 ShaH ₂ complexes of Mo formed in air	10
Figure 3.1 Structural formula of Schiff bases: (a) H_2L1 ; (b) H_2L2 ; (c) H_2L3 ; (d) H_2L4 (e) H_2L5 and (f) H_2L6	26
Figure 4.1 FTIR of H ₂ L1	42
Figure 4.2 ¹ H-NMR spectrum of H ₂ L1	43
Figure 4.3 ¹³ C-NMR spectrum of H ₂ L1	44
Figure 4.4 UV-vis spectrum of H ₂ L1 in DMSO	45
Figure 4.5 FTIR spectrum of [NiL1(H ₂ O) ₂]	46
Figure 4.6 UV-vis spectrum of [NiL1(H ₂ O) ₂] in DMSO	47
Figure 4.7 Tanabe-Sugano diagram for d ⁸ octahedral complexes	47
Figure 4.8 TGA for [NiL1(H ₂ O) ₂]	48
Figure 4.9 Proposed structural formula of [NiL1(H ₂ O) ₂]	49
Figure 4.10 FTIR spectrum of [CuL1(H ₂ O)]	50
Figure 4.11 UV-vis spectrum of [CuL1(H ₂ O)]	51
Figure 4.12 TGA for [CuL1(H ₂ O)]	52
Figure 4.13 Proposed structural formula of [CuL1(H ₂ O)]	52
Figure 4.14 FTIR spectrum of [ZnL1].2H ₂ O	53
Figure 4.15 UV-vis spectrum of [ZnL1].2H ₂ O	54
Figure 4.16 TGA for [ZnL1].2H ₂ O	55

Figure 4.17 Proposed structural formula of [ZnL1].2H ₂ O	55
Figure 4.18 FTIR spectrum of H ₂ L2	56
Figure 4.19 ¹ H-NMR spectrum of H ₂ L2	57
Figure 4.20 ¹³ C-NMR spectrum of H ₂ L2	58
Figure 4.21 UV-vis spectrum of H ₂ L2 in DMSO	59
Figure 4.22 FTIR spectrum of [NiL2(H ₂ O) ₂]	60
Figure 4.23 UV-vis spectrum of [NiL2(H ₂ O) ₂] in DMSO	61
Figure 4.24 TGA for [NiL2(H ₂ O) ₂]	62
Figure 4.25 Proposed structural formula of [NiL2(H ₂ O) ₂]	62
Figure 4.26 FTIR spectrum of [CuL2(H ₂ O)]	63
Figure 4.27 UV-vis spectrum of [CuL2(H ₂ O)]	64
Figure 4.28 TGA for[CuL2].H ₂ O	65
Figure 4.29 Proposed structural formula of [CuL2(H ₂ O)]	66
Figure 4.30 FTIR spectrum of [ZnL2].2H ₂ O	67
Figure 4.31 UV-vis spectrum of [ZnL2].2H ₂ O	68
Figure 4.32 TGA for [ZnL2].2H ₂ O	69
Figure 4.33 Proposed structural formula of [ZnL2].2H ₂ O	69
Figure 4.34 FTIR spectrum of H ₂ L3	70
Figure 4.35 ¹ H-NMR spectrum of H ₂ L3	71
Figure 4.36 ¹³ C-NMR spectrum of H ₂ L3	72
Figure 4.37 UV-vis spectrum of H ₂ L3 in DMSO	73
Figure 4.38 FTIR spectrum of [NiL3(H ₂ O) ₂]	74
Figure 4.39 UV-vis spectrum of [NiL3(H ₂ O) ₂] in DMSO	75

Figure 4.40 TGA for [NiL3(H ₂ O) ₂]	76
Figure 4.41 FTIR spectrum of [CuL3(H ₂ O)]	77
Figure 4.42 UV-vis spectrum of [CuL3(H ₂ O)]	78
Figure 4.43 TGA for [CuL3(H ₂ O)]	79
Figure 4.44 FTIR spectrum of [ZnL3].2H ₂ O	80
Figure 4.45 UV-vis spectrum of [ZnL3].2H ₂ O	81
Figure 4.46 TGA for [ZnL3].2H ₂ O	82
Figure 4.47 FTIR spectrum of H ₂ L4	83
Figure 4.48 ¹ H-NMR spectrum of H ₂ L4	84
Figure 4.49 ¹³ C-NMR spectrum of H ₂ L4	85
Figure 4.50 UV-vis spectrum of H ₂ L4 in DMSO	86
Figure 4.51 FTIR spectrum of [NiL4(H ₂ O) ₂]	87
Figure 4.52 UV-vis spectrum of [NiL4(H ₂ O) ₂] in DMSO	88
Figure 4.53 Tanabe-Sugano diagram for d ⁸ octahedral complexes	89
Figure 4.54 TGA for [NiL4(H ₂ O) ₂]	90
Figure 4.55 Proposed structural formula of [NiL4(H ₂ O) ₂]	90
Figure 4.56 FTIR spectrum of [CuL4(H ₂ O)]	91
Figure 4.57 UV-vis spectrum of [CuL4(H ₂ O)]	92
Figure 4.58 TGA for [CuL4(H ₂ O)]	93
Figure 4.59 Proposed structural formula of [CuL4(H ₂ O)]	93
Figure 4.60 FTIR spectrum of [ZnL4].2H ₂ O	94
Figure 4.61 UV-vis spectrum of [ZnL4].2H ₂ O	95
Figure 4.62 TGA for [ZnL4].2H ₂ O	96

Figure 4.63 Proposed structural formula of [ZnL4].2H ₂ O	96
Figure 4.64 FTIR spectrum of H ₂ L5	97
Figure 4.65 ¹ H-NMR spectrum of H ₂ L5	98
Figure 4.66 ¹³ C-NMR spectrum of H ₂ L5	99
Figure 4.67 UV-vis spectrum of H ₂ L5 in DMSO 7	99
Figure 4.68 FTIR spectrum of [NiL5(H ₂ O) ₂]	100
Figure 4.69 UV-vis spectrum of [NiL5(H ₂ O) ₂] in DMSO	101
Figure 4.70 TGA for [NiL5(H ₂ O) ₂]	102
Figure 4.71 FTIR spectrum of [CuL5(H ₂ O)]	103
Figure 4.72 UV-vis spectrum of [CuL5(H ₂ O)]	104
Figure 4.73 TGA for[CuL5].H ₂ O	105
Figure 4.74 FTIR spectrum of [ZnL5].2H ₂ O	106
Figure 4.75 UV-vis spectrum of [ZnL5].2H ₂ O	107
Figure 4.76 TGA for [ZnL5].2H ₂ O	108
Figure 4.77 FTIR spectrum of H ₂ L6	109
Figure 4.78 ¹ H-NMR spectrum of H ₂ L6	110
Figure 4.79 ¹³ C-NMR spectrum of H_2L6	111
Figure 4.80 UV-vis spectrum of H ₂ L6 in DMSO	112
Figure 4.81 FTIR spectrum of [NiL6(H ₂ O) ₂]	113
Figure 4.82 UV-vis spectrum of [NiL6(H ₂ O) ₂] in DMSO	114
Figure 4.83 TGA for [NiL6(H ₂ O) ₂]	115
Figure 4.84 Proposed structural formula of [NiL6(H ₂ O) ₂]	115
Figure 4.85 FTIR spectrum of [CuL6(H ₂ O)]	116

Figure 4.86 UV-vis spectrum of [CuL6(H ₂ O)]	117
Figure 4.87 TGA for [CuL6(H ₂ O)]	118
Figure 4.88 Proposed structural formula of [CuL6(H ₂ O)	118
Figure 4.89 FTIR spectrum of [ZnL6].2H ₂ O	119
Figure 4.90 UV-vis spectrum of [ZnL6].2H ₂ O	120
Figure 4.91 TGA for [ZnL6].2H ₂ O	121
Figure 4.92 Proposed structural formula of [ZnL6].2H ₂ O	122