LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1.1	Spinel structure	6
1.2	Angle between A-A, B-B and A-B cations in a spinel structure	9
2.1	Flow chart of ferrite preparation	25
2.2	X-ray diffraction pattern of $MgFe_2O_4$	37
2.3	X-ray diffraction pattern of $Mg_{0.2}Zn_{0.8}Fe_2O_4$	38
2.4	X-ray diffraction pattern of $Mg_{0.4}Zn_{0.6}Fe_2O_4$	39
2.5	X-ray diffraction pattern of $Mg_{0.6}Zn_{0.4}Fe_2O_4$	40
2.6	X-ray diffraction pattern of $Mg_{0.8}Zn_{0.2}Fe_2O_4$	41
2.7	X-ray diffraction pattern of $ZnFe_2O_4$	42
2.8	Variation of lattice parameter with Zinc content for $Mg_xZn_{(1-x)}Fe_2O_4$	43

2.9	Variation of average bond length R_A with content of Zinc	54
2.10	Variation of average bond length R_B with content of Zinc	55
3.1	Experimental set up for d.c. electrical conductivity measurement	72
3.2	Circuit diagram to measure conductivity	73
3.3a	Log ρ Vs $10^3/T$ plot for $MgFe_2O_4$ sintered at 1100° C for 15 hours	76
3.3b	Log ρ Vs $10^3/T$ plot for $Mg_{0.8}Zn_{0.2}Fe_2O_4$ sintered at 1100° C for 15 hours	77
3.3c	Log ρ Vs $10^3/T$ plot for $Mg_{0.4}Zn_{0.6}Fe_2O_4$ sintered at 1100° C for 15 hours	78
3.3d	Log ρ Vs $10^3/T$ plot for $Mg_{0.2}Zn_{0.8}Fe_2O_4$ sintered at 1100° C for 15 hours	79
3.3e	Log ρ Vs $10^3/T$ plot for $ZnFe_2O_4$ sintered at 1100° C for 15 hours	80
3.4a	Log ρ Vs $10^3/T$ plot for $MgFe_2O_4$ sintered at 1100° C for 30 hours	81
3.4b	Log ρ Vs $10^3/T$ plot for $Mg_{0.8}Zn_{0.2}Fe_2O_4$ sintered at 1100° C for 30 hours	82

3.4c	Log ρ Vs $10^3/T$ plot for $Mg_{0.4}Zn_{0.4}Fe_2O_4$ sintered at 1100° C for 30 hours	83
3.4d	Log ρ Vs $10^3/T$ plot for $Mg_{0.2}Zn_{0.6}Fe_2O_4$ sintered at 1100° C for 30 hours	84
3.4e	Log ρ Vs $10^3/T$ plot for $ZnFe_2O_4$ sintered at 1100° C for 30 hours	85
3.5	Variation of T_c with content of Zinc	90
4.1	Inverse susceptibility ($1/\chi$) Vs Temperature (T) plot	112
4.2	Sponteneous magnetization (M) Vs Temperature (T) plot	112
4.3	Sponteneous magnetization (M) Vs Temperature (T) plot	112
4.4	Magnetization curve and hysteresis loop	117
4.5	Experimental set up for hysteresis measurements	120
4.6	Bohr magneton (μ_B) Vs contents of Zinc plot for sample sintered at 1100° C for 30 hours	126
4.7	Bohr magneton (μ_B) Vs contents of Zinc plot for sample sintered at 1100° C for 15 hours	127
4.8	Saturation magnetization (M_s) Vs contents of Zinc plot for sample	

	sintered at 1100° C for 30 hours	128
4.9	Saturation magnetization (M_s) Vs contents of Zinc plot for sample sintered at 1100° C for 15 hours	129
4.10	IR spectrum of $Mg_{0.2}Zn_{0.8}Fe_2O_4$	137
4.11	IR spectrum of $Mg_{0.4}Zn_{0.6}Fe_2O_4$	138
4.12	IR spectrum of $Mg_{0.6}Zn_{0.46}Fe_2O_4$	139
4.13	IR spectrum of $Mg_{0.8}Zn_{0.26}Fe_2O_4$	140
5.1	SEM Micrograph of $Mg_{0.6}Zn_{0.4}Fe_2O_4$ sintered at 1100° C for 30 hours	164
5.2	SEM Micrograph of $Mg_{0.6}Zn_{0.4}Fe_2O_4$ sintered at 1100° C for 15 hours	164