

C O N T E N T S

Chapter	Title	Page
I	INTRODUCTION	(1 - 47)
	1.1 Introduction	1
	1.2 Historical	3
	1.3 a)Structure of ferrites	5
	b)Classification of ferrites	6
	c)Types of ferrites	9
	d)Crystal types of ferrites	10
	1.4 Characterisation	11
	1)Hysteresis behaviour	13
	ii)Curie temperature	14
	iii)Magnetostriction	16
	iv)Crystalline anisotropy constant K_1	16
	1)Domain walls	17
	v)Initial permeability	19
	v 1)Temperature variation of initial permeability	22
	v 2)Frequency dispersion of initial permeability	22
	vi)Remanent magnetisation	23
	vii)Coercive force H_c	24
	viii)Loss factor	26
	1.5 Neel's theory of ferrimagnetism	28
	1.6 Yafet Kittel theory of ferrimagnetism	31
	1.7 Applications of ferrites	32
	1.8 Data on Li, Zn and Cu ferrites	38
	1.9 Brief survey of Cu - Zn ferrites	40
	1.10 Orientation of present work	42
	References	45

Chapter	Title	Page
II	PREPARATION AND CHARACTERISATION	(48 - 101)
	Part A - Method of Preparation	
2.1	Introduction	48
2.2	Four steps of ferrite synthesis	49
	a) Ceramic method	50
	b 1) Hydroxide precipitation	52
	b 2) Oxalate precipitation	53
2.3	Presintering and sintering	53
2.4	Mechanism of solid state reaction	58
2.5	Preparation of ferrite samples	60
	i) Disadvantages of standard ceramic method	60
	ii) Advantages of chemical method	60
	iii) Synthesis of $Zn_{0.5}Cu_{0.5-t}Li_{2t}Fe_2O_4$ ferrites	60
	iv) Decomposition	62
	v) Pellet formation	63
	vi) Torroid formation	63
	vii) Final sintering	63
	Part B - X-Ray Diffraction Studies	
2.6	Introduction	64
2.7	Condition for X-ray diffraction	66
2.8	X-ray diffractometer	69
2.9	Indexing of the powder pattern	72
2.10	Results and Discussions	75

Chapter	Title	Page
II	Part C - Density Measurements	
	2.11 Introduction	87
	2.12 Xylene method	87
	2.13 Porosity measurements	90
	Part D - Microstructure	
	2.14 Introduction	92
	2.15 Experimental	93
	2.16 Results and discussions	93
	References	98
III	MAGNETIC PROPERTIES	(102 - 160)
	Part A - A.C.Susceptibility Studies	
	3.1 Introduction	102
	3.2 Experimental	
	a)Description of the susceptibility apparatus	103
	b)Susceptibility measurement	106
	3.3 Results and discussions	107
	Part B - Hysteresis	
	3B.1 Introduction	115
	3B.2 Experimental	115
	3B.3 Results and discussions	120

Chapter	Title		Page
III	3B.3	1) Compositional variation of magnetic moments n_B	120
		ii) Magnetocrystalline anisotropy field H_K^A	124
		iii) Magnetocrystalline anisotropy constant K_1	125
		iv) Remanence ratio R	126
		Part C - Initial Permeability	
	3C.1	Introduction	128
	3C.2	Experimental	130
	3C.3	Results and discussion	
		1) Compositional variation of initial permeability	131
		ii) Thermal variation of initial permeability	136
	iii) Frequency dependence of initial permeability	141	
	iv) Loss factor	144	
	References	148	
IV	SUMMARY AND CONCLUSIONS		152 - 155