

<b>CONTENTS</b>		
<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE</b>
<b>I</b>	<b>INTRODUCTION</b>	
	1.1 Introduction	01
	1.2 Historical	02
	1.3 a ) Spinel crystal structure of ferrites	04
	b ) Ni - Zn ferrite structure	08
	c ) Classification of ferrites	09
	d ) Crystal types of ferrites	10
	1.4 Characterisation	
	I ) Hysteresis	12
	II ) Dimain theory of Weiss	13
	III ) Curie temperature	14
	IV) Magnetostriction	14
	V ) Crystalline anisotropy constant	14
	VI ) Initial Permeability $\mu_i$	15
	* The temperature variation of initial permeability	
	* Frequency distribution of initial permeability	
	VII ) Remanent magnetization	17
	VIII ) Coercive Force	17
	IX ) Loss factor	18
	1.5 Neel's Theory of ferrimagnetism	19
	1.6 Yafet Kittel Theory of ferrimagnetism	21
	1.7 Applications of Ni-Cu-Zn ferrites	23
	1.8 Brief survey of Ni-Cu-Zn ferrites	24
	1.9 Orientation of work	25
	References	28
<b>II</b>	<b>SYNTHESIS AND CHARACTEISATION</b>	
	Part A - Methods of synthesis	
	2.1 Introduction	30
	2.2 Four steps of ferrites synthesis	
	a ) Ceramic method	31
	2.3 Synthesis of ferrites by chemical method	33
	2.4 Precursor method	37
	a ) Oxalic precursors	38
	2.5 Presintering and sintering	39
	2.6 Mechanism of solid state reaction	42
	2.7 a ) Synthesis / Experimental	42-47
	b ) Synthesis of $F^{2+}$ acetate	
	c ) Synthesis of Ni-Cu-Zn Fe oxalate complexes	
	d ) Decomposition of precursors	
	e ) Toroid formation	
	f ) Final sintering	

<b>CONTENTS</b>		
<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE</b>
	<b>Part B X-ray diffraction</b>	
	2.8 Introduction	48
	2.9 Condition for X-ray diffraction	50
	2.10 X-ray diffractometer	51
	2.11 Indexing of powder pattern	54
	2.12 Target selection	54
	2.13 Results and discussion	60-63
	<b>Part C - Density measurements</b>	
	2.14 Introduction	64
	2.15 Experimental	
	I) Xylene method	64
	2.16 Porosity measurements	65-67
	<b>Part D - Scanning Electron Microscopy ( SEM)</b>	
	2.17 Introduction	68
	2.18 Experimental	69
	2.19 Results and discussion.	69-71
	Reference	72-75
<b>III</b>	<b>MAGNET PROPERTIES</b>	
	<b>PART A - A.C. Susceptibility Studies</b>	
	3.1 Introduction	76
	3.2 Experimental	76-79
	a) Description of susceptibility	
	b) Susceptibility measurement	
	3.3 Results and discussions	80-86
	<b>PART - B Hysteresis</b>	
	3 B.1 Introduction	87
	3B.2 Experimental	88
	3B.3 Results and discussions	
	I) Compositional variation of magnetic moment $n_B$	91
	II) Magnetocrystalline anisotropy field $H_K^A$	95
	III) Magnetocrystalline anisotropy constant $K_1$	95
	IV) Remanance ratio R	96

<b>CONTENTS</b>		
<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE</b>
	<b>PART -C Initial permeability</b>	
	3C.1 Introduction	98
	3C.2 ) Experimental	100
	3C.3 ) Results and discussion	
	I ) Compositional variation of initial permeability	100
	II ) Thermal variation of initial permeability	106
	III ) Frequency dependance of initial permeability	111
	IV ) Loss factor	114
	Reference	118-120
<b>IV</b>	<b>SUMMARY AND CONCLUSSIONS</b>	121