C O N T E N T S

CHAPTER NO.		T I T L E	PAGE NO.
		LIST OF TABLES	V
		LIST OF FIGURES	VI
CHAPTER I:		SOME BASIC ASPECTS OF LUMINESCENCE.	1
1-1		INTRODUCTION.	2
1-2		DEFINITIONS.	3
	1-2.1	Luminescence.	3
	1-2.2	Fluorescence and Phosphorescence.	5
1-3		PHOSPHORS.	5
	1-3.1	Phosphors in Pure Form.	5
	1-3.2	Impurity Activated Phosphors.	6
1-4		THE TERMS.	6
	1-4.1	Luminescence Centres.	6
	1-4.2	Traps.	6
	1-4.3	Metastable Levels.	6
1-5		MECHANISM OF PHOTOLUMINESCENCE.	7
	1-5.1	Excitation and Emission.	7
	1-5.2	Energy Transfer.	10
	1-5.3	Energy Storage.	12
1-6		STATEMENT OF PROBLEM.	16
1-7		REFERENCES.	19
CHAPTER II:		PREPARATION OF PHOSPHORS & EXPERIMENTAL ASPECTS:	28
2-1		PREPARATION OF PHOSPHORS.	29
	2-1.1	Phosphors in Microcrystalline Powder Form.	29
		A) Basic Ingredients of Phosphors.	29
		B) Preparative Parameters of Phosphors.	32

CHAPTER NO.		T I T L E		PAGE NO.
	2-1.2	Preparation of Alkaline Earth Sulphide Phosphors.	..	34
	2-1.3	Details of the Method Followed.	..	35
	2-1.4	Prepared Phosphors.	..	38
2-2		EXPERIMENTAL ASPECTS.	..	38
	2-2.1	Phosphorscence Decay Measurements.	..	39
	2-2.2	Thermoluminescence Measurements.	..	41
2-3		REFERENCES.	..	44
CHAPTER III:		STUDY OF PHOSPHORESCENCE DECAY.	..	50
3-1		INTRODUCTION.	..	51
3-2		THEORETICAL BACKGROUND.	..	51
	3-2.1	Decay Laws.	..	51
		A) Exponential Decay.	..	51
		B) Hyperbolic Decay.	..	53
	3-2.2	Effect of Steady Excitation of a Phosphor on Filling of Electron Traps.	..	54
	3-2.3	The Effect of Excitation Intensity on the Filling of Traps with Complex Distribution.	..	57
	3-2.4	Phosphorescence Decay for Different Trap Distribution.	..	58
		A) Uniform Distribution of Trap Levels.	..	58
		B) Quasi-Uniform Trap Distribution.	..	59
		C) Exponential Trap Distribution.	..	59
3-3		RESULT AND DISCUSSION.	..	60
	3-3.1	Decay Curves.	..	60
	3-3.2	Decay Constant.	..	61

CHAPTER NO.		TITLE	PAGE NO.
	3-3.3	Variation of Decay Constant with Concentration of Flux.	.. 62
	3-3.4	"Peeling Off" of the Decay Curves.	.. 62
	3-3.5	Activation Energy.	.. 64
	3-3.6	Rate Constant and Life Times.	.. 65
	3-3.7	Kinetics of Decay Process.	.. 65
	3-3.8	Distribution of Trapping Levels.	.. 66
3-4		SUMMARY.	.. 67
3-5		REFERENCES.	.. 71
CHAPTER IV:		THERMOLUMINESCENCE.	.. 90
4-1		INTRODUCTION.	.. 91
4-2		THEORETICAL CONSIDERATIONS.	.. 92
	4-2.1	Theory of the Thermoluminescence.	.. 92
		A) Randall and Wilkin's Theory.	.. 92
		B) Garlick and Gibson's Theory.	.. 93
	4-2.2	Methods for Determining the Trap Depth.	.. 94
		A) Methods Based on T_m .	.. 94
		B) Methods Based on the Shape of the Glow Curves.	.. 97
		C) Methods Based on Both Shape and T_m.	.. 99
	4-2.3	Method for Determining the Escape Frequency Factor.	.. 105
		A) Method due to Randall and Wilkin's.	.. 106
4-3		RESULTS AND DISCUSSION.	.. 106
	4-3.1	Glow Curves.	.. 106
	4-3.2	Activation Energy Determination.	.. 107

CHAPTER NO.		T I T L E	PAGE NO.
	4-3.3	Effect of Flux Concentration on Activation Energy.	.. 109
	4-3.4	Escape Frequency Factor (S).	.. 110
	4-3.5	Kinetics of Thermoluminescence.	.. 110
4-4		SUMMARY.	.. 111
4-5		REFERENCES.	.. 117
CHAPTER V:		GENERAL DISCUSSION & CONCLUSIONS.	.. 130
5-1		NATURE OF DECAY.	.. 130
5-2		ACTIVATION ENERGIES FROM DECAY CURVES.	131
5-3		DISTRIBUTION OF TRAPS.	.. 131
5-4		KINETICS.	.. 132
5-5		ACTIVATION ENERGIES FROM GLOW CURVES...	133
5-6		ESCAPE FREQUENCY FACTOR.	.. 133
5-7		EFFECT OF FLUX ON DISTRIBUTION OF TRAPPING STATES.	.. 134
5-8		KINETICS OF THERMOLUMINESCENCE.	.. 134
5-9		CONCLUSIONS.	.. 135
5-10		REFERENCES.	.. 137