CONTENTS

CHAPTER -1 INTRODUCTION 1-5

CHAPTER -2 GENERAL CONCEPTS OF LUMINESCENCE AND THERMOLUMINESCENCE 6-44

General Aspects of Luminescence 6

Types of Luminescence 6

Photoluminescence : Fluorescence and Phosphorescence 7

Theories of Luminescence 10

Configuration Co-ordinate Model 10

Energy Band Model 11

Effect of temperature on luminescence 14

Fluorescence in Coumarin 15

Applications of Luminescence 16

Thermoluminescence 20

General Concept of Thermoluminescence 20

Thermoluminescence in Polymers 24

Characteristics of TL in Polymers 24

Nature of Traps 26

Luminescence Centres 28

Electron Detrapping Mechanisms 29

Thermal stimulation and Kinetics 31

TL in Synthetic Polymers 34

Applications of thermoluminescence 34

References 36
CHAPTER -3 POLYMERS 46-64

Introduction 46
Classification of Polymers 46
Techniques of Polymerization 50
Application of Polymers 54
Molecular weight of polymers 56
Effect of Temperature 58
Effect of Radiation 59
Effect of Mechanical Treatment 59
Coumarins 60
Derivatives of Coumarins 60
Reactivity of Coumarins 61
References 64

CHAPTER -4 EXPERIMENTAL TECHNIQUES 65-78

Synthesis of Monomer and its Copolymers 65
Synthesis of 5-7 dihydroxy-4-methyl Coumarin 65
Preparation of Acid Chloride 65
Polymerization 66
Infrared Spectra 67
Viscosity 68
Preparation of Specimen 69
As Received Specimen 70
Mechanically deformed specimens 70
Thermal treatment 70
Instrumentation 71
Spectrophotofluorometer 71
TL glow curve Reader 76
References 78