CONTENTS

CHAPTER 1 - INTRODUCTION

1.1 Electrical properties of inorganic solids 1

1.1.1 Electronic conductors 2

1.1.1.1 The conductivity characteristics of semiconductors 3

1.1.1.2 Measurement of conductivity of solids 8

1.1.1.3 Parameters affecting the conductivity of solids 10

1.1.1.4 Mechanisms of electronic conduction 16

1.1.2 Ionic conductors 19

1.1.2.1 Types of ionic conductors 20

1.1.2.2 Ion transport in point-defect-type solids 21

1.1.2.3 Ion transport in molten-sublattice-type solids 23

1.1.2.4 Microscopic theories of ion dynamics in superionic solids 24

1.1.3 Mixed conductors 27

1.2 Optical properties of crystalline solids 27

1.2.1 Interband transitions 28

1.2.2 Intraband transitions 29

1.2.3 Optical absorption edge 30

1.2.4 Temperature and pressure effects on optical absorption edge 31

1.3 Optical properties of amorphous solids 32

1.4 Phase equilibria 33