

CONTENTS

ABSTRACT

CHAPTER-I

INTRODUCTION AND LITERATURE REVIEW (1-52)

I-1 : Glass Definition	1
I-1-1 : The Structure of Glass	3
I-1-2 : The Random Network Theory	3
I-1-3 : Glass Formation	4
I-2 : Band Models	7
I-2-1 : The Simplest Band Model	7
I-2-2 : Mott - CFO Model	8
I-2-3 : Davis - Mott Model	9
I-2-4 : Marshall - Owen Model	9
I-2-5 : Small Polaron Model	10
I-2-6 : Sharp Band Edge Model	10
I-3: D.C Electrical Conductivity of Amorphous Semiconductors	11
I-4 : Ionic Conduction	13
I-5 : High Field Conduction	16

III-2-3 : Switching Mechanism	72
III-3 : A.C conduction and dielectric properties	78
III-3-1 : Total Conductivity	78
III-3-2 : Temperature Dependence of the Total Conductivity	84
III-3-3 : Effect of Frequency and Temperature on the Dielectric Constant .	84
III-3-4 : Effect of Frequency and Temperature on the Dielectric Loss .	87
III-3-5 : Frequency Dependence of the Dielectric Loss Tangent	92
III-3-6 : Temperature Dependence of Bulk Conductivity .	93
IV : CONCLUSIONS	98
REFERENCES	100
ARABIC SUMMARY	

I-6 : Switching and Memory Characteristic	18
I-6-1 : Heterogeneous Model	21
I-6-2 : Thermal and Electrothermal Theory	22
I-6-3 : Electronic Theory	24
I-7 : The A.C Conductivity in Amorphous Semiconductors .	25
I-7-1: Transport by Carriers Excited to The Extended States Near E_c or E_v .	26
I-7-2: Transport by Carriers Excited into the Localized State at the Edges of the Valence or Conduction Band .	26
I-7-3: Hopping Transport by Electrons with Energies Near the Fermi Level , $N(E_F)$ is Finite	26
I-8 : Dielectric Properties	27
I-8-1 : Polarization in Glass	28
I-8-2 : Dielectric Constant of Glass	29
I-8-3 : Dielectric Losses in Glass	29
I-8-4 : The Effect of Frequency and Temperature on the Dielectric loss .	31
I-9 : Dielectric Relaxation	33
I-10 : Complex Impedance Method	35

1-11 : Literature Review	39
1-12 : Aim of the Work	52
CHAPTER-II	
EXPERIMENTAL WORK	53-59
II-1 : Preparation of the Glass Sample	53
II-2 : Characterization of Samples	54
II-2-1 : X-ray Diffraction Patterns	54
II-2-2 : Differential Thermal Analysis	54
II-2-3 : Optical Microscopic	57
II-3 : Electrical Measurement	57
II-3-1 : Conductivity Measurement	57
II-3-2 : I-V Characteristic Measurement	58
II-4 : A.C Conductivity Measurement	58
CHAPTER-III	
RESULTS AND DISCUSSIONS	(60-97)
III-1 : D.C Electrical Conductivity	60
III-2 : I-V Characteristic	64
III-2-1 : Influence of Lithium Phosphate and Temperature on the Turnover Point	68
III-2-2 : Effect of Thickness on I-V Characteristic	70
