

Contents

1	Introduction	1
	References.....	4
2	Effect of Thermal Evaporation Conditions on Structure and Structural Changes in Amorphous Arsenic Sulfides	5
2.1	Introduction to Amorphous Solids	5
2.2	Experimental Investigation of the Influence of Thermal Evaporation Conditions	6
2.3	Summary.....	12
	References.....	13
3	Optical Absorption and Structural Transformations in Arsenic Selenide Films	15
3.1	Sample Preparation and Measurement Technique	18
3.2	Raman Scattering in Amorphous Selenium.....	19
3.3	Composition Dependence of Raman Bands in Amorphous Se-Rich $\text{As}_x\text{Se}_{1-x}$ Alloys	22
3.4	Laser-Induced Structural Transformation of $\text{As}_x\text{Se}_{1-x}$ Amorphous Films	25
3.5	Summary.....	32
	References.....	33
4	Trap Level Spectroscopy in Amorphous Selenium-Based Semiconductors	35
4.1	Thermally Stimulated Depolarisation Currents in Amorphous Chalcogenides: Background	36
4.2	Thermally Stimulated Depolarisation Currents in Se-Based Amorphous Semiconductors: Experimental Details	42
4.2.1	Sample Preparation	42
4.2.2	Experimental Arrangement.....	42

4.3	Thermally Stimulated Depolarisation Currents in Se-Based Amorphous Semiconductors	43
4.3.1	TSDC in Pure Selenium	43
4.3.2	TSDC in $As(Sb)_x Se_{1-x}$ alloys	46
4.4	Summary	49
	References	49
5	Photoinduced Effects on Electronic Metastable States	51
5.1	Steady-State Photocurrents	51
5.2	Light-Induced Effects on Photocurrent Transients	52
	References	58
6	Deep Level Spectroscopy in Selenium-Rich Amorphous Semiconductors	59
6.1	Xerographic Dark Decay and Photoinduced Effects	59
6.2	Residual Voltage in Se-Rich Photoreceptors	63
	References	64
7	Recombination Process and Non-Isothermal Relaxation of Low-Temperature Photoinduced Effects	65
7.1	Recombination Process as it Appears in the Photocurrent Transients	65
7.2	Non-Isothermal Relaxation of Low-Temperature Photoinduced Effects	66
7.3	Possible Mechanism of Photoinduced Changes	68
	References	71
8	Electronic Properties of Materials with Gross Permanent Photoinduced Changes	73
8.1	Structure	74
8.2	Electronic Properties	76
8.3	Thermally Stimulated Currents	77
8.4	Carrier Transport in Cu-As-Se Amorphous Semiconductors	81
8.5	Concluding Remarks	87
	References	87
9	Carrier Transport in Selenium-Based Amorphous Multilayer Structures	89
9.1	Monolayer Systems	91
9.2	Multilayer Systems	92
9.3	The Effect of the Interface	95
9.4	Light-Induced Effects on Photocurrent Transients	96

9.5	Use of Multilayer Structures for the Determination of Transit Time	97
9.6	Concluding Remarks	98
	References	99
10	Spectroscopic Studies of Gap States and Laser-Induced Structural Transformations in Selenium-Based Arsenic-Free Amorphous Semiconductors: $\text{Sb}_x\text{Se}_{1-x}$ Alloys	101
10.1	Basic Properties	103
10.2	Dark Discharge	105
10.3	Transient Photoconductivity	106
10.4	Photoinduced Discharge Characteristics	107
10.5	Optical Properties	112
10.6	Structural Transformation	113
	References	118
	Index	119