

Table of Contents

Foreword

Some New Developments in the Physics of Non-Crystalline Solids N.F. Mott	3
Some New Developments in Glass Science	18
Structure of Amorphous Organic Polymers in Bulk	33
Structure of Non-Crystalline Inorganic Solids	52
Investigation of Glass Structure by Nuclear Magnetic Resonance Techniques	65
Investigation of Short Range Order in Amorphous Polymers by Means of Stress-Optical Measurements	81
Optical Transparency in Two-Phase Polymer Systems	88
Studies on Molecular Motions in Amorphous Polymers by Raman Scattering	94
The Vibration Spectra and Structure of Vitreous and Crystalline Alkali Borates	101
Structure Determination Using EXAFS in Real Space	108
Diffraction Studies of Glasses Using the Harwell Electrom Linac Pulsed Neutron Source	113
Neutron Scattering Techniques for Structural Studies of Amorphous Solids	118
A Study of the Structure of Non-Crystalline Media by Means of Electromagnetic Scattering	124
Crystallization and Phase Separation in $\text{Li}_2\text{O-SiO}_2$ Glass Studied by Positron Annihilation	129
The Elementary Defect in the Glasses	135
Some Physical Properties of $\text{CaO-Fe}_2\text{O}_3\text{-B}_2\text{O}_3$ Glasses in Relation to Structure	142
Redox Conditions of Formation of Libyan Desert Glass+	148
Radiation-Induced Defect Centers in Non-Crystalline SiO_2	154
The EPR Study of Transition Elements in Aluminosilicate Glasses and Glass-Ceramics	160
The ERP of the Separated Glasses in Relation to their Structural, Electric, and Optical Properties	166
Investigation of Amorphous and Crystalline Phases in the $\text{CdGe}_{1-x}\text{Sb}_x\text{As}_2$ System	172
Infrared and Structural Studies of Amorphous TiSe	178
Mechanism of Crystallization in Glassy Eutectic Te-Ge Alloy	184
Stabilization of a High T_c Amorphous Molybdenum Phase by Interstitial Nitrogen	190
Electrical and Optical Properties of Amorphous Semiconductors	197
Electronic Structure of Non-Crystalline Metals	212
Thermal Quenching of Photoconductivity in Amorphous Selenium	218
On the Interpretation of Thermal Activation Energies in Chalcogenide Glasses	224
Gap States and the Chemical Bond in Amorphous Semiconductors	230
The Hall Effect in Amorphous As_2Se_3	236
Fatigue and Recovery of Electrophotographic Properties of Amorphous As_2Se_3-Films	242
Electronic Conduction of Titanium Ions in the $\text{BaO}\cdot\text{B}_2\text{O}_3\cdot\text{SiO}_2$ Glass System	248
Hopping Transport in Semiconducting Copper-Calcium-Phosphate Glasses	254
Memory and Threshold Switching in Semiconducting $\text{V}_2\text{O}_5\text{-GeO}_2\text{-PbO}$ Glasses	260
Charge Trapping and Dielectric Breakdown in Lead Silicate Glasses	266
Studies of DC Conductivity and Electrical Breakdown in Phase Separated Glasses	272
Electrical Conductivity of Ion Implanted Amorphous Silicon	278
Electrical Properties of Thermally Grown SiO_2 Layers, Undoped and Doped, by Means of Ion Implantation	284
Excess Charges in Amorphous Organic Polymers	291
The Effects of Chemical-Ordering on the Optical Properties of Binary Chalcogenide Glasses: Ge-S, Ge-Se, As-S and As-Se	297
The Kinetics of Photodissolution of Thin Film of Silver in Amorphous As_2S_3	305

Thermoluminescence Studies of Glasses Containing Different Additives	306
The Optical Constants of Some Silicate Glasses in the Infra-Red and Vacuum Ultra-Violet	312
Density-Refractive Index Relationships in Some Optical Glasses	318
Darkening Mechanisms in Silver-Halide Photochromic Glass under Pulsed-Laser Excitation	324
Absorption Spectra of Cu^{2+} Ions in Some Lead Glasses	330
Absorption Spectra of Nd^{3+} Ions in Lead Silicate Glasses	336
Some Unusual Optical Properties of Elongated Phases in Glass	342
Phosphite Glasses for Use in Laser Amplifiers and Optical Isolators	348
Thermodynamical and Model-Statistical Treatment of the Glassy Solidification	355
Statistical Thermodynamics of Chainmolecular Amorphous Solids	370
Internal Parameters, Ordering Parameters, History, and the Glass Transition	384
Sources of the Configurational Specific Heat and Entropy of Liquids near the Glass Transition	391
Viscosity, Structural Model and Related Properties for As-Se-Te Glasses	397
A Model for the Glass Transition Behavior in Binary Selenide Systems	405
The Effect of Pressure on the Glass Transition and the Glassy State of Amorphous Polystyrene	411
Shrinking Kinetics of Biaxially Oriented PMMA in the Transformation Range	419
Mass Transport in Non-Crystalline Solids	427
Measurement of Low Diffusion Coefficient Values in Different Glasses	447
NMR Studies of Ionic Motion in Oxide Glasses	453
Interdiffusion in a Glassy and Polycrystalline Lithium Aluminosilicate	459
Influences of Ion-Exchange Temperature and Time on Stress Profiles and Strengths of Chemically Strengthened Glass	465
A New Technique for Strengthening Glasses	471
Ion Motion and the Mixed Alkali Effect	473
Relation between the Mixed-Alkali Effect and the Electrical Conductivity of Ion-Exchanged Glasses	480
Reactions between Hydrogen and Vitreous Silica	486
A Study of the Motion of Ionic Impurities in Non-Crystalline SiO_2	494
Simultaneous Transfer of Different Cations across Anodic Electrolyte Solution-Glass Interfaces in Electric Fields	503
Effect of Phase Separation on Diffusion Processes	509
Molecular Origin of Relaxations in Non-Crystalline Solids	515
Time-Temperature-Pressure Superposition in Elastomers	528
An Equation of State for a Class of Viscoelastic Deformations	529
Main Relaxation in Some Alkyl Halides around T_g	534
Dielectric Behaviour of Glasses and Polymers at Very Low Temperatures	542
A Survey of Mechanical and Dielectric Relaxation in Vitreous Alkali Borates and Phosphates	548
Influence of Multivalent Ions of Internal Friction in Alkali-Silicate Glasses	554
Anomalies of Glasses at Low Temperatures	559
Propagation of Ultrasound at Low Temperatures in Glasses of Different Structure	562
The Lifetime of Acoustic Phonons in Glasses at Low Temperatures	568
Low Temperature Acoustic Absorption in Amorphous Silica	574
Low-Frequency Light Scattering in Glasses	580
The Vibrational Properties of α-Ge	586
Infrared and Thermal Studies of Glassy Tellurium-Silicon Alloys	591
Structure Sensitive Expansivity in Silica	598
Correlation between Measured and Calculated Craze Zones at Crack Tips in PMMA at Different Temperatures	605

Isothermal and Adiabatic Effects Associated with Crack Propagation in Poly(Methyl Methacrylate) and Polystyrene	612
The Effect of Different Liquids on the Transition from Slow to Fast Crack Propagation in Soda-Lime-Glass	618
The Behaviour of Pristine and Scratched Soda-Lime-Silica Sheet Glass during Bending	625
Elastic Moduli of Ge-As-Se Glasses	631
Determination of Residual Stress in Strengthened Glass-Ceramic Rods	639
Supermolecular Structures and Mechanical Behaviour of Oriented Amorphous Polymers	645
Thermally Stimulated Creep in Non-Crystalline Solids	651
Some Interesting Amorphous Solids of the Future	657