

Contents

LIST OF CONTRIBUTORS	v
PREFACE	vii
CONTENTS OF OTHER VOLUMES	xiii

THERMAL PHENOMENA I

Chapter 1 Thermal Conductivity

M. G. Holland

I. Introduction	3
II. Theory	5
III. Measurement Techniques	11
IV. Thermal Conduction in Various III-V Compounds	13
V. Special Effects	20
VI. Summary	24
VII. Conclusions	30

Chapter 2 Thermal Expansion

S. I. Novikova

I. Introduction	33
II. Experimental Results	37
III. Calculation of the Grüneisen Parameter	44

Chapter 3 Heat Capacity and Debye Temperatures

U. Piesbergen

I. Introduction	49
II. Heat Capacity	50
III. Debye Temperature Θ_D	53

PHYSICAL PROPERTIES I

Chapter 4 Lattice Constants

G. Giesecke

I. Introduction	63
II. Measurement of Lattice Constants	65
III. Summary	73

Chapter 5 Elastic Properties*J. R. Drabble*

I. Introduction	75
II. Thermodynamic and Atomistic Aspects	77
III. The Propagation of Elastic Waves	88
IV. Effects of Carrier Concentration on the Elastic Constants	97
V. Experimental Results	109
VI. Conclusion	114

Chapter 6 Low Energy Electron Diffraction Studies*A. U. Mac Rae and G. W. Gobeli*

I. Introduction	115
II. Experimental Techniques	122
III. Results	124
IV. Conclusions	136

MAGNETIC RESONANCES**Chapter 7 Nuclear Magnetic Resonance***Robert Lee Mieher*

I. Introduction	141
II. NMR Absorption Line	145
III. Relaxation, Saturation, and Polarization	165
Appendix	183

Chapter 8 Electron Paramagnetic Resonance*Bernard Goldstein*

I. Introduction	189
II. The Paramagnetic Resonance Condition and the Spin Hamiltonian	190
III. Gallium Arsenide	191
IV. Indium Antimonide	199
V. Gallium Phosphide	200
VI. Résumé and Concluding Remarks	200

PHOTOELECTRIC EFFECTS**Chapter 9 Photoconduction in III-V Compounds***T. S. Moss*

I. Introduction	205
II. Theory	206
III. Experimental Results	225
List of Symbols	243

Chapter 10 Quantum Efficiency of the Internal Photoelectric Effect in InSb

E. Antončik and J. Tauc

I. Introduction	245
II. Experimental	247
III. Theory	249
IV. Discussion	261

Chapter 11 Photoelectric Threshold and Work Function

G. W. Gobeli and F. G. Allen

I. Introduction and Discussion	263
II. Measurement Techniques	269
III. Results and Discussion	274

PHOTON EMISSION

Chapter 12 Nonlinear Optics in III–V Compounds

P. S. Pershan

I. Introduction	283
II. General Discussion	283
III. Theory	286
IV. Experiment	286
V. Conclusion	288

Chapter 13 Radiative Recombination in the III–V Compounds

M. Gershenson

I. Introduction	289
II. GaP	303
III. GaAs	325
IV. Other Compounds	357
V. Notes Added in Proof	366

Chapter 14 Stimulated Emission in Semiconductors

Frank Stern

I. Introduction	371
II. Relation between Stimulated and Spontaneous Emission	374
III. Laser Structures	376
IV. Modes, Directionality, and Coherence	380
V. Quantum Efficiency	389
VI. Radiation Confinement, Threshold, and Loss	396
VII. Laser Materials	403
VIII. Effects of Ambients and External Fields	407

AUTHOR INDEX	413
SUBJECT INDEX	425