

CONTENTS

Foreword	vii
CHAPTER	PAGE
1 Luminescence of Solids [with emphasis on Electroluminescence]	1
<i>By A. G. Fischer, R. E. Shrader, and S. Larach</i>	
Historical Aspects of Phosphor Synthesis	1
Modern Aspects of Phosphor Synthesis	2
General Comments	3
Types of Luminescence	6
Physical Characteristics of Phosphors	9
Excitation by Electric Fields	15
The Mechanism of AC Electroluminescence	23
DC Injection Electroluminescence	71
2 Photoconductors	100
<i>By Richard H. Bube</i>	
Introduction	100
Fundamental Electronic Processes in a Photoconductor	101
Speed of Response	104
Photosensitivity	106
Imperfection Sensitization	108
Methods of Increasing Speed of Response	111
Detection of Traps	113
Maximum Performance	122
Research toward Improved Photoconductivity Performance	124
Future of Photoconductivity	137
3 Infrared-Sensitive Extrinsic Germanium and Germanium-Silicon Alloy Photoconductors	140
<i>By M. L. Schultz and G. A. Morton</i>	
Extrinsic Photoconductivity	140
Extrinsic Germanium Photoconductors	147
Germanium-Silicon Alloy Photoconductors	151
Performance of Impurity-Activated Germanium-Silicon Alloy Photoconductors	154
Generalized Behavior of Infrared Photoconductors	159
Preparation of Extrinsic Germanium and Germanium-Silicon Alloy Photoconductors	161
Optical Considerations	165
Electrical Considerations	170

4	Photoelectric Emission	175
	<i>By A. H. Sommer and W. E. Spicer</i>	
	Introduction	175
	The Physics of Photoemission	176
	Preparation and Properties of Photocathodes	196
	Photocathode Applications	216
5	Noise Currents	222
	<i>By A. Rose</i>	
	General Formalism	222
	Photon Currents	224
	Emission Limited Currents	224
	Photomultipliers	224
	Photoconductor (Trap Free)	225
	Johnson Noise	227
	Current Noise in Semiconductors with Traps	229
	Space-Charge-Limited Currents	230
	Photoconductor including Traps	231
	Comparison of Noise Limitations for Photoconductors and Optical Maser	233
	Comparative Noise Power in the Radio and Optical Spectra	234
	General Comments on Noise	236
6	The Photovoltaic Effect	239
	<i>By Paul Rappaport and J. J. Wysocki</i>	
	Theory	241
	Optimum Semiconductor and Temperature Effects	243
	The Generated Current and Collection Efficiency	247
	Series Resistance	255
	Black-Body Considerations and Detailed Balance Limit of Efficiency	256
	Experimental Characteristics of Solar Cells	258
	Cadmium Sulfide Cells	263
	Radiation Damage to Solar Cells	267
7	Solid-State Optoelectronics	276
	<i>By E. E. Loebner</i>	
	Introduction	276
	Optical Signaling	277
	Photons	279
	Photon Irradiation of Solids	280
	Electronic Photon Generation in Solids	283
	Modulators and Amplifiers	287
	Optoelectronic Systems Engineering	291
	Picture Display Panels	292
	Logic Networks and Functional Components	295
	Shift Registers	300
	Image Processing	302

8 Solid-State Image Intensifiers	313
<i>By F. H. Nicoll</i>	
Introduction	313
Single-Layer Intensifiers	319
Double-Layer Intensifiers	324
Double-Layer Intensifiers Without Optical Feedback	329
Image Storage with Optical Feedback	356
Image Storage without Optical Feedback	361
Comparison of Performance Characteristics of Image Intensifying Panels	370
9 A Review of Electrofax Behavior	374
<i>By James A. Amick</i>	
Introduction	374
Materials Suitable for Electrofax Use	376
Physical Properties of an Electrofax Layer	383
A Band Model for Electrofax Layers	385
Light Adaptation of an Electrofax Layer	387
Dark Adaptation of an Electrofax Layer	389
Corona Charging and the Dark Discharge of Electrofax Layers	390
Photodischarge of Electrofax Layers	394
Blocking Contacts to the Electrofax Layer	395
Injecting Contacts to the Electrofax Layer	399
Dye Sensitization of Electrofax Layers	400
The Volume Charge Capacitor Model for Electrofax	402
Formation of the Latent Images on an Electrofax Sheet	409
Development of the Latent Images	410
Latent Conductivity Plus Latent Charge Image	415
Controlling the Contrast Characteristics of Electrofax Layers	419
Glossary	422
Index	425