

CONTENTS

FOREWORD	vii
PREFACE	ix
I. INTRODUCTION	1
II. MECHANISMS OF ELECTROLUMINESCENCE	3
A. Effects of Electric Fields on Solids	3
B. Injection Electroluminescence	5
C. Acceleration-Collision Electroluminescence	8
D. Other Electroluminescence Mechanisms	10
III. ELECTROLUMINESCENCE IN ZINC SULFIDE AND RELATED PHOSPHORS	13
A. Preparation and Chemical Properties	17
B. Structural Properties; Localization of Emission	28
C. Electrical Properties	39
D. Variation of Output with Voltage	42
E. Effects of Frequency and Temperature	50
F. Electroluminescence Efficiency	60
G. Time Effects	65
1. Buildup	65
2. Persistence	67
3. Maintenance of Output	68
H. Excitation by Nonsinusoidal Voltages	77
I. Output Waveshape for Sinusoidal Excitation and the Recombination Process	83
1. The Primary Peaks	84
2. The Secondary Peaks	89
3. The Continuous Component	99
J. Mechanism of Electroluminescence in <i>ZnS</i> , Particularly the Excitation Process	101
K. Practical Considerations in Design of Electroluminescent Cells	121
IV. ELECTROLUMINESCENCE IN OTHER MATERIALS	127
A. Cadmium Sulfide	127
B. Silicon Carbide	130
C. Germanium	139
D. Silicon	145
E. Gallium Phosphide	154
F. Galvanoluminescence in Al_2O_3 and Other Oxides	161
G. Other Materials	166
1. Other II-VI Compounds	166
2. Other III-V Compounds	168
3. Diamond	172
4. Miscellaneous Materials	175

V. FIELD EFFECTS IN EXCITED PHOSPHORS.	181
A. The Gudden-Pohl and Other Transient Effects	182
1. The Gudden-Pohl Effect	182
2. Effect of Fields on Infrared Stimulation of Luminescence	188
B. Quenching of Luminescence by Fields.	191
1. The Phenomena of Quenching	191
2. Output Waveform in Quenching of Photoluminescence	197
3. Effect of Radiation on Electroluminescent Waveforms	201
4. The Mechanisms of Quenching	203
5. Effects of Fields on Infrared Quenching of Luminescence	207
C. Enhancement of Luminescence in Nonelectroluminescent Phosphors	208
1. Excitation by Ultraviolet or X-Rays	208
2. Excitation by Cathode Rays or Alpha Particles	219
3. Effect of Infrared Radiation on the Enhancement Effect.	223
4. The Mechanism of Enhancement in Nonelectroluminescent Phosphors.	225
D. Enhancement of Luminescence in Electroluminescent Phosphors	230
1. The Experimental Observations	230
2. The Mechanism of Enhancement in Electroluminescent Phosphors	236
E. Summary	240
REFERENCES	240
AUTHOR INDEX.	261
SUBJECT INDEX.	272