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transition in high-mobility two-dimensional systems; 1.5.3 Evidence against a true metal-insulator transition in two-dimensional systems; 1.5.4 Temperature-dependent charge carrier scattering; 1.6 CONCLUSIONS; REFERENCES; 2: Description of Charge Transport in Amorphous Semiconductors 2.1 INTRODUCTION 2.2 GENERAL REMARKS ON CHARGE TRANSPORT IN DISORDERED MATERIALS; 2.3 HOPPING CHARGE TRANSPORT IN DISORDERED MATERIALS VIA LOCALIZED STATES; 2.3.1 Nearest-neighbor hopping; 2.3.2 Variable-range hopping; 2.4 DESCRIPTION OF CHARGE-CARRIER ENERGY RELAXATION AND HOPPING CONDUCTION IN INORGANIC NONCRYSTALLINE MATERIALS; 2.4.1 Dispersive transport in disordered materials; 2.4.2 The concept of the transport energy; 2.5 EINSTEIN'S RELATIONSHIP FOR HOPPING ELECTRONS; 2.5.1 Nonequilibrium charge carriers; 2.5.2 Equilibrium charge carriers; 2.6 STEADY-STATE PHOTOCONDUCTIVITY 2.6.1 Low-temperature photoconductivity 2.6.2 Temperature dependence of the photoconductivity; 2.7 THERMALLY STIMULATED CURRENTS-A TOOL TO DETERMINE DOS?; 2.8 DARK CONDUCTIVITY IN AMORPHOUS SEMICONDUCTORS; 2.9 NONLINEAR FIELD EFFECTS; 2.10 CONCLUDING REMARKS; REFERENCES; 3: Hydrogenated Amorphous Silicon-Material Properties and Device Applications; 3.1 INTRODUCTION; 3.2 PREPARATION AND STRUCTURAL PROPERTIES OF AMORPHOUS SILICON; 3.3 DENSITY OF STATES DISTRIBUTION IN THE ENERGY GAP; 3.3.1 Model of the density of states distribution; 3.3.2 Band-tail states; 3.3.3 Deep defect states 3.4 OPTICAL PROPERTIES 3.5 TRANSPORT PROPERTIES; 3.6 RECOMBINATION OF EXCESS CARRIERS; 3.6.1 Low-temperature regime ($T \leq 60$ K); 3.7 DEVICE APPLICATIONS; 3.7.1 Schottky barrier diodes; 3.7.2 p-i-n diodes; 3.7.3 Thin-film transistors; 3.8 THIN-FILM SOLAR CELLS; REFERENCES; 4: Applications of Disordered Semiconductors in Modern Electronics: Selected Examples; 4.1 PERSPECTIVES ON AMORPHOUS SEMICONDUCTORS; 4.2 DIRECT CONVERSION DIGITAL X-RAY IMAGE DETECTORS; 4.3 X-RAY PHOTOCONDUCTORS; 4.4 STABILIZED AMORPHOUS SELENIUM (a-Se) 4.5 AVALANCHE MULTIPLICATION AND ULTRA-HIGH-SENSITIVE HARP VIDEO TUBE

Sommario/riassunto

The field of charge conduction in disordered materials is a rapidly evolving area owing to current and potential applications of these materials in various electronic devices. This text aims to cover conduction in disordered solids from fundamental physical principles and theories, through practical material development with an emphasis on applications in all areas of electronic materials. International group of contributorsPresents basic physical concepts developed in this field in recent years in a uniform mannerBrings up-to-date, in a one-stop source, a key evolving area in
