半导体物理性能手册

第 2 卷 （上册）

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半导体物理性能手册

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HANDBOOK ON PHYSICAL PROPERTIES OF SEMICONDUCTORS

Volume 2 III–V Compound Semiconductors

Edited by
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原版影印说明

1.《半导体物理性能手册》（5册）是 *Springer Handbook on Physical Properties of Semiconductors* 的影印版。为使用方便，由原版3卷分册影印：

Volume 1 Group IV Semiconductors 为第1卷；

Volume 2 III–V Compound Semiconductors 分为第2卷上册（1～9）、下册（10～18）；

Volume 3 II–VI Compound Semiconductors 分为第3卷上册（1～9）、下册（10～17）。

2. 各册均给出其他卷、册的目录，方便读者了解全套书的内容。

《半导体物理性能手册》介绍了各族半导体、化合物半导体的物理性能，包括：

Structural Properties 结构特性

Thermal Properties 热学性质

Elastic Properties 弹性性质

Phonons and Lattice Vibronic Properties 声子与晶格振动性质

Collective Effects and Related Properties 集体效应及相关性质

Energy-Band Structure: Energy-Band Gaps 能带结构：能带隙

Energy-Band Structure: Electron and Hole Effective Masses 能带结构：电子和空穴的有效质量

Electronic Deformation Potential 电子形变势

Electron Affinity and Schottky Barrier Height 电子亲和能与肖特基势垒高度

Optical Properties 光学性质

Elastooptic, Electrooptic, and Nonlinear Optical Properties 弹光、电光和非线性光学性质

Carrier Transport Properties 载流子输运性质

适用对象包括材料、微电子学、电子科学与技术等专业的本科生和研究生，以及从事半导体研究的专业人员。

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HANDBOOK ON PHYSICAL PROPERTIES OF SEMICONDUCTORS

VOLUME 2

III-V Compound Semiconductors

PREFACE

The progress made in physics and technology of semiconductors depends mainly on three families of materials: the group-IV elemental, III–V, and II–VI compound semiconductors. As is well known, silicon widely dominates the market of semiconductor devices and circuits. However, a number of III–V compound semiconductor devices and circuits have recently been built, and non-negligible efforts are devoted to those types of materials, which offer a number of interesting properties. At present, III–V compound semiconductors are widely used as materials for optoelectronic devices, such as light emitting diodes and laser diodes, and for electronic devices, such as field-effect transistors (FET's), high electron mobility transistors (HEMT's), heterojunction bipolar transistors (HBT's), and integrated circuits (IC's). These applications are becoming key elements in an advanced information society.

The aim throughout has been to present in convenient form as large amount of accurate, reliable, and up-to-date information on the physical properties of III–V compound semiconductors for a variety of basic research and device applications. The data on the physical properties of each semiconductor are organized in the same way in order to facilitate searching for information. The physical properties considered in this book can be classified into 12 groups: (1) structural properties; (2) thermal properties; (3) elastic properties; (4) phonons and lattice vibronic properties; (5) collective effects and related properties; (6) energy-band structure:

energy-band gaps; (7) energy-band structure: electron and hole effective mass; (8) electronic deformation potential; (9) electron affinity and Schottky barrier height; (10) optical properties; (11) elastooptic, electrooptic, and nonlinear optical properties; and (12) carrier transport properties.

The extensive bibliography is included for those who wish to find additional information if required. I hope that the book will aid many who want to know various properties of those semiconductor materials in the course of their work. The reader will also find the series books "Group-IV Semiconductors" and "II–VI Compound Semiconductors" useful in order to find the needed information quickly on these practically important semiconductors.

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