

1. Record Nr.	UNINA9911020072703321
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Titolo	Properties of semiconductor alloys : group-IV, III-V and II-VI semiconductors // Sadao Adachi
Pubbl/distr/stampa	Chichester, West Sussex, U.K. ; ; Hoboken, N.J., : Wiley, 2009
ISBN	9786612123528 9781282123526 1282123521 9780470744383 0470744383 9780470744390 0470744391
Descrizione fisica	1 online resource (424 p.)
Collana	Wiley series in materials for electronic & optoelectronic applications
Disciplina	621.3815/2
Soggetti	Semiconductors - Materials Semiconductors - Analysis Silicon alloys
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Properties of Semiconductor Alloys: Group-IV, III-V and II-VI Semiconductors; Contents; Series Preface; Preface; Abbreviations and Acronyms; Introductory Remarks; A.1 AN ALLOY AND A COMPOUND; A. 2 GRIMM-SOMMERFELD RULE; A.3 AN INTERPOLATION SCHEME; REFERENCES; 1 Structural Properties; 1.1 IONICITY; 1.2 ELEMENTAL ISOTOPIC ABUNDANCE AND MOLECULAR WEIGHT; 1.3 CRYSTAL STRUCTURE; 1.3.1 Random Alloy; 1.3.2 Spontaneous Ordering; (a) Group-IV semiconductor alloy; (b) III-V semiconductor alloy; (c) II-VI semiconductor alloy; 1.4 LATTICE CONSTANT AND RELATED PARAMETERS 1.4.1 CuAu Alloy: Ordered and Disordered States1.4.2 Non-alloyed Semiconductor; 1.4.3 Semiconductor Alloy; (a) Group-IV semiconductor; (b) III-V semiconductor; (c) II-VI semiconductor; 1.5 COHERENT EPITAXY AND STRAIN PROBLEM; 1.5.1 Bilayer Model; 1.5.2 Elastic Strain and Lattice Deformation; 1.5.3 Critical Thickness; 1.6

STRUCTURAL PHASE TRANSITION; 1.7 CLEAVAGE PLANE; 1.7.1 Cleavage; 1.7.2 Surface Energy; REFERENCES; 2 Thermal Properties; 2.1 MELTING POINT AND RELATED PARAMETERS; 2.1.1 Phase Diagram; (a) Group-IV semiconductor alloy; (b) III-V semiconductor alloy (c) II-VI semiconductor alloy 2.1.2 Melting Point; 2.2 SPECIFIC HEAT; 2.2.1 Group-IV Semiconductor Alloy; 2.2.2 III-V Semiconductor Alloy; 2.2.3 II-VI Semiconductor Alloy; 2.3 DEBYE TEMPERATURE; 2.3.1 General Considerations; 2.3.2 Group-IV Semiconductor Alloy; 2.3.3 III-V Semiconductor Alloy; 2.3.4 II-VI Semiconductor Alloy; 2.4 THERMAL EXPANSION COEFFICIENT; 2.4.1 Group-IV Semiconductor Alloy; 2.4.2 III-V Semiconductor Alloy; 2.4.3 II-VI Semiconductor Alloy; 2.5 THERMAL CONDUCTIVITY AND DIFFUSIVITY; 2.5.1 Thermal Conductivity; (a) General considerations; (b) Group-IV semiconductor alloy (c) III-V semiconductor alloy (d) II-VI semiconductor alloy; 2.5.2 Thermal Diffusivity; (a) General considerations; (b) Alloy value; REFERENCES; 3 Elastic Properties; 3.1 ELASTIC CONSTANT; 3.1.1 General Considerations; 3.1.2 Room-temperature Value; (a) Group-IV semiconductor alloy; (b) III-V semiconductor alloy; (c) II-VI semiconductor alloy; 3.1.3 External Perturbation Effect; (a) Temperature effect; (b) Pressure effect; 3.2 THIRD-ORDER ELASTIC CONSTANT; 3.3 YOUNG'S MODULUS, POISSON'S RATIO AND SIMILAR PROPERTIES; 3.3.1 Group-IV Semiconductor Alloy; 3.3.2 III-V Semiconductor Alloy 3.3.3 II-VI Semiconductor Alloy 3.4 MICROHARDNESS; 3.4.1 Group-IV Semiconductor Alloy; 3.4.2 III-V Semiconductor Alloy; 3.4.3 II-VI Semiconductor Alloy; 3.5 SOUND VELOCITY; REFERENCES; 4 Lattice Dynamic Properties; 4.1 PHONON DISPERSION RELATIONSHIPS; 4.2 PHONON FREQUENCY; 4.2.1 General Considerations; 4.2.2 Room-temperature Value; (a) Group-IV semiconductor alloy; (b) III-V semiconductor alloy; (c) II-VI semiconductor alloy; 4.2.3 External Perturbation Effect; (a) Group-IV semiconductor alloy; (b) III-V semiconductor alloy; (c) II-VI semiconductor alloy; 4.3 MODE GRUNEISEN PARAMETER 4.3.1 Phonon Deformation Potential

Sommario/riassunto

The main purpose of this book is to provide a comprehensive treatment of the materials aspects of group-IV, III-V and II-VI semiconductor alloys used in various electronic and optoelectronic devices. The topics covered in this book include the structural, thermal, mechanical, lattice vibronic, electronic, optical and carrier transport properties of such semiconductor alloys. The book reviews not only commonly known alloys (SiGe, AlGaAs, GaInPAs, and ZnCdTe) but also new alloys, such as dilute-carbon alloys (CSiGe, CSiSn, etc.), III-N alloys, dilute-nitride alloys (GaNAs and GaInNAs) and Mg- or

2. Record Nr.	UNISOBSOBE00084827
Titolo	12: 1. agosto-10 settembre 1526 / Francesco Guicciardini
Pubbl/distr/stampa	Pisa, : Edizioni della Normale [Firenze], : Istituto nazionale di studi sul Rinascimento, 2024
ISBN	9788876427718
Descrizione fisica	517 p. ; 25 cm
Collana	Clavis ; 17
Lingua di pubblicazione	Italiano
Formato	Materiale a stampa
Livello bibliografico	Monografia