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Systems; 1.1 Introduction; 1.2 Basic Principles; 1.3 Phases and Their Properties; 1.3.1 Structural Order of a Phase; 1.4 Equations of State of Thermodynamic Systems; 1.4.1 Thermodynamic Transformations and Functions of State; 1.4.2 Work Associated with a Transformation, Entropy and Free Energy; 1.4.3 Chemical Potentials; 1.4.4 Free Energy and Entropy of Spontaneous Processes
1.4.5 Effect of Pressure on Phase Transformations,
Polymorphs/Polytypes Formation and Their Thermodynamic Stability
1.4.6 Electrochemical Equilibria and Electrochemical Potentials of Charged Species; 1.5 Equilibrium Conditions of Multicomponent Systems Which Do Not React Chemically; 1.6 Thermodynamic Modelling of Binary Phase Diagrams; 1.6.1 Introductory Remarks; 1.6.2 Thermodynamic Modelling of Complete and Incomplete Miscibility; 1.6.3 Thermodynamic Modelling of Intermediate Compound Formation; 1.6.4 Retrograde Solubility, Retrograde Melting and Spinodal Decomposition
1.7 Solution Thermodynamics and Structural and Physical Properties of Selected Semiconductor Systems
1.7.1 Introductory Remarks; 1.7.2 Au-Ag and Au-Cu Alloys; 1.7.3 Silicon and Germanium; 1.7.4 Silicon-Germanium Alloys; 1.7.5 Silicon- and Germanium-Binary Alloys with Group III and Group IV Elements; 1.7.6 Silicon-Tin and Germanium-Tin Alloys; 1.7.7 Carbon and Its Polymorphs; 1.7.8 Silicon Carbide; 1.7.9 Selenium-Tellurium Alloys; 1.7.10 Binary and Pseudo-binary Selenides and Tellurides; 1.7.11 Arsenides, Phosphides and Nitrides
1.8 Size-Dependent Properties, Quantum Size Effects and Thermodynamics of Nanomaterials
Appendix; Use of Electrochemical Measurements for the Determination of the Thermodynamic Functions of Semiconductors; References; Chapter 2 Point Defects in Semiconductors; 2.1 Introduction; 2.2 Point Defects in Ionic Solids: Modelling the Electrical Conductivity of Ionic Solids by Point Defects-Mediated Charge Transfer; 2.3 Point Defects and Impurities in Elemental Semiconductors; 2.3.1 Introduction
2.3.2 Vacancies and Self-Interstitials in Semiconductors with the Diamond Structure: an Attempt at a Critical Discussion of Their Thermodynamic and Transport Properties
2.3.3 Effect of Defect-Defect Interactions on Diffusivity: Trap-and-Pairing Limited Diffusion Processes; 2.3.4 Light Impurities in Group IV Semiconductors: Hydrogen, Carbon, Nitrogen, Oxygen and Their Reactivity; 2.4 Defects and Non-Stoichiometry in Compound Semiconductors; 2.4.1 Structural and Thermodynamic Properties; 2.4.2 Defect Identification in Compound Semiconductors; 2.4.3 Non-Stoichiometry in Compound Semiconductors
References
