

1. Record Nr.	UNINA9910132171003321
Autore	Benz Klaus-Werner
Titolo	Introduction to crystal growth and characterization // Klaus-Werner Benz and Wolfgang Neumann ; with a contribution by Anna Mogilatenko
Pubbl/distr/stampa	Weinheim, Germany : , : Wiley-VCH, , 2014 ©2014
ISBN	3-527-68924-9 3-527-68434-4 3-527-68436-0
Descrizione fisica	1 online resource (441 p.)
Disciplina	548.5
Soggetti	Crystal growth
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	Introduction to Crystal Growth and Characterization; Contents; Preface; Acknowledgments; Chapter 1 Fundamentals of Crystalline Materials; 1.1 Crystalline State; 1.2 Fundamentals of Geometrical Crystallography; 1.2.1 Crystal Lattices; 1.2.2 Crystal Axes Systems, Crystal Systems, and Crystal Families; 1.2.3 Crystal Faces and Zones; 1.2.4 Indexing in the Hexagonal Crystal Family; 1.3 Morphological Symmetry of Crystals; 1.3.1 Crystallographic Point Groups; 1.3.2 Some Basic Facts of Group Theory; 1.4 Structural Symmetry; 1.4.1 Crystal Lattices, Motifs, and Crystal Structures 1.4.1.1 Bravais Lattices 1.4.1.2 The Reciprocal Lattice; 1.4.1.3 Lattice Transformations; 1.4.2 Crystallographic Space Groups; 1.4.2.1 General Remarks; 1.4.2.2 The International Tables for Crystallography - The Reference Book for the Representation of Space Group Symmetries; 1.4.2.3 Mathematical Description of the Space Group Symmetry; 1.4.3 Generalized Crystallographic Symmetry; 1.5 Crystal Structures; 1.5.1 Sphere Packings; 1.5.2 Selected Examples of Inorganic Structure Types; 1.5.2.1 Polymorphism and Polytypism; 1.5.3 Selected Examples of Molecular Crystals 1.5.4 Symmetry Relations between Crystal Structures 1.6 Crystallographic Databases and Crystallographic Computer Programs; Appendix: Supplementary Material S1 Special Crystal Forms of Cubic

Crystal Classes; References; Chapter 2 Basics of Growth Mechanism and Solidification; 2.1 Nucleation Processes; 2.1.1 Homogeneous Nucleation; 2.1.2 Heterogeneous Nucleation; 2.1.3 Metastable Zone Regime; 2.1.4 Equilibrium Shape of Crystals; 2.2 Kinetic Processes and Growth Mechanism; 2.2.1 Molecular Kinetic Theory of Crystal Growth; 2.2.2 Interfaces and Roughening of Surfaces; 2.2.3 Vapor-Liquid-Solid (VLS) Mechanism; 2.2.4 Crystal Growth from Ambient Phases on Rough Surfaces: Vapor Phase, Solution, and Melt Media; 2.2.5 Crystal Growth on Flat Surfaces; 2.3 Phase Diagrams and Principles of Segregation; 2.3.1 Phase Diagrams with a Continuous Miscibility in the Solid and Liquid Phases; 2.3.2 Segregation and Segregation Coefficients; 2.3.3 Constitutional Supercooling and Morphological Stability; 2.4 Principles of Flow Regimes in Growth Melts; 2.4.1 Buoyancy Convection; 2.4.2 Marangoni Convection; References Chapter 3 Growth Techniques in Correlation with Related Growth Mechanism; 3.1 Overview on Main Growth Techniques; 3.2 Principles of Melt Growth Techniques; 3.2.1 The Czochralski Crystal Growth Process; 3.2.2 Growth Method after Bridgman; 3.2.3 The Float Zone Crystal Growth Process; 3.2.4 Bulk Crystal Growth from Metallic Solutions; 3.2.4.1 Traveling Solvent Method (TSM); 3.2.4.2 Traveling Heater Method (THM); 3.2.4.3 The Solute, Synthesis, Diffusion Method (SSD); 3.3 Bulk Crystal Growth of II-VI Compounds from the Vapor; 3.3.1 Crystal Growth of CdTe by a Sublimation Traveling Heater Method, STHM, in Closed Ampoules

---

#### Sommario/riassunto

This new textbook provides for the first time a comprehensive treatment of the basics of contemporary crystallography and crystal growth in a single volume. The reader will be familiarized with the concepts for the description of morphological and structural symmetry of crystals. The architecture of crystal structures of selected inorganic and molecular crystals is illustrated. The main crystallographic databases as data sources of crystal structures are described. Nucleation processes, their kinetics and main growth mechanism will be introduced in fundamentals of crystal growth. Some phase d

---