

1. Record Nr.	UNINA9910784613803321
Autore	Smallman R. E
Titolo	Physical metallurgy and advanced materials [[electronic resource]]
Pubbl/distr/stampa	Amsterdam ; ; Boston, : Butterworth Heinemann, 2007
ISBN	1-281-07736-4 9786611077365 0-08-055286-2
Edizione	[7th ed. /]
Descrizione fisica	1 online resource (673 p.)
Altri autori (Persone)	NganA. H. W SmallmanR. E
Disciplina	669/.9
Soggetti	Physical metallurgy
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Rev. ed. of: Modern physical metallurgy and materials engineering. 1999.
Nota di contenuto	Front cover; Physical metallurgy and advanced materials; Copyright page; Contents; Preface; About the authors; Acknowledgments; Illustration credits; Chapter 1 Atoms and atomic arrangements; 1.1 The realm of materials science; 1.2 The free atom; 1.2.1 The four electron quantum numbers; 1.2.2 Nomenclature for the electronic states; 1.3 The Periodic Table; 1.4 Interatomic bonding in materials; 1.5 Bonding and energy levels; 1.6 Crystal lattices and structures; 1.7 Crystal directions and planes; 1.8 Stereographic projection; 1.9 Selected crystal structures; 1.9.1 Pure metals 1.9.2 Diamond and graphite 1.9.3 Coordination in ionic crystals; 1.9.4 AB-type compounds; Chapter 2 Phase equilibria and structure; 2.1 Crystallization from the melt; 2.1.1 Freezing of a pure metal; 2.1.2 Plane-front and dendritic solidification at a cooled surface; 2.1.3 Forms of cast structure; 2.1.4 Gas porosity and segregation; 2.1.5 Directional solidification; 2.1.6 Production of metallic single crystals for research; 2.2 Principles and applications of phase diagrams; 2.2.1 The concept of a phase; 2.2.2 The Phase Rule; 2.2.3 Stability of phases; 2.2.4 Two-phase equilibria 2.2.5 Three-phase equilibria and reactions 2.2.6 Intermediate phases; 2.2.7 Limitations of phase diagrams; 2.2.8 Some key phase diagrams; 2.2.9 Ternary phase diagrams; 2.3 Principles of alloy theory; 2.3.1

Primary substitutional solid solutions; 2.3.2 Interstitial solid solutions; 2.3.3 Types of intermediate phases; 2.3.4 Order-disorder phenomena; 2.4 The mechanism of phase changes; 2.4.1 Kinetic considerations; 2.4.2 Homogeneous nucleation; 2.4.3 Heterogeneous nucleation; 2.4.4 Nucleation in solids; Chapter 3 Crystal defects; 3.1 Types of imperfection; 3.2 Point defects
3.2.1 Point defects in metals 3.2.2 Point defects in non-metallic crystals; 3.2.3 Irradiation of solids; 3.2.4 Point defect concentration and annealing; 3.3 Line defects; 3.3.1 Concept of a dislocation; 3.3.2 Edge and screw dislocations; 3.3.3 The Burgers vector; 3.3.4 Mechanisms of slip and climb; 3.3.5 Strain energy associated with dislocations; 3.3.6 Dislocations in ionic structures; 3.4 Planar defects; 3.4.1 Grain boundaries; 3.4.2 Twin boundaries; 3.4.3 Extended dislocations and stacking faults in close-packed crystals; 3.5 Volume defects; 3.5.1 Void formation and annealing
3.5.2 Irradiation and voiding 3.5.3 Voiding and fracture; 3.6 Defect behavior in common crystal structures; 3.6.1 Dislocation vector diagrams and the Thompson tetrahedron; 3.6.2 Dislocations and stacking faults in fcc structures; 3.6.3 Dislocations and stacking faults in cph structures; 3.6.4 Dislocations and stacking faults in bcc structures; 3.6.5 Dislocations and stacking faults in ordered structures; 3.7 Stability of defects; 3.7.1 Dislocation loops; 3.7.2 Voids; 3.7.3 Nuclear irradiation effects; Chapter 4 Characterization and analysis; 4.1 Tools of characterization; 4.2 Light microscopy
4.2.1 Basic principles
