1. Record Nr. UNINA9910830192103321

Titolo	Quasicrystals [[electronic resource]] : structure and physical properties / / Hans-Rainer Trebin (ed.)
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2003
ISBN	1-280-52113-9 9786610521135 3-527-60657-2 3-527-60678-5
Descrizione fisica	1 online resource (674 p.)
Altri autori (Persone)	TrebinH.-R (Hans-Rainer)
Disciplina	530.4/1 530.41
Soggetti	Quasicrystals
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	Quasicrystals Structure and Physical Properties; Preface; Contents; List of Contributors; 1 Synthesis, metallurgy and characterization; 1.1 Single-quasicrystal growth; 1.1.1 Introduction; 1.1.2 Solidification and phase diagrams of intermetallic alloy systems; 1.1.3 Single-crystal growth techniques; 1.1.4 Single-crystal growth of quasicrystals; 1.1.5 Conclusions; Bibliography; 1.2 Phase equilibria of the Al-Cu-Fe system; 1.2.1 Introduction; 1.2.2 Relevant data of the phase diagram in literature; 1.2.3 Experimental; 1.2.4 Phase diagram of the Al-Cu-Fe system 1.2.5 Formation and stability of the ø-phase1.2.6 Solidification behaviour; 1.2.7 Conclusions; Bibliography; 1.3 Preparation of Zn-Mg-RE quasicrystals and related compounds (RE = Y, Ho, Er, Dy); 1.3.1 Introduction; 1.3.2 Preparation methods; 1.3.3 Face centered icosahedral quasicrystals; 1.3.4 Simple icosahedral quasicrystals; 1.3.5 Decagonal quasicrystals; 1.3.6 Related crystalline compounds; 1.3.7 Summary; Bibliography; 1.4 On the formation of quasicrystals in Zr-based metallic glasses; 1.4.1 Introduction; 1.4.2 Experimental; 1.4.3 Results and discussion; 1.4.4 Alloying; 1.4.5 Conclusions Bibliography1.5 Growth of decagonal Al-Co-Ni and Al-Co-Cu

quasicrystals by the Czochralski method; 1.5.1 Introduction; 1.5.2 Czochralski growth; 1.5.3 Al-Co-Ni quasicrystals; 1.5.4 Al-Co-Cu quasicrystals; 1.5.5 Summary; Bibliography; 2 Structure and mathematical modelling; 2.1 Decagon clusters in perfect and random decagonal structures; 2.1.1 Introduction; 2.1.2 The framework of cluster coverings; 2.1.3 Random cluster covering model; 2.1.4 Unit-cluster approach for Penrose-type structures; 2.1.5 Summary; Bibliography; 2.2 Coverings in the structure of quasicrystals
2.2.1 Introduction: Geometric concepts in the structure of quasicrystals2.2.2 Tiling models and the triangle tiling; 2.2.3 From tiling to covering; 2.2.4 Windows for the Delone covering of the tiling; 2.2.5 Colouring the tiles in the triangle tiling; 2.2.6 Covering for icosahedral tilings; 2.2.7 Summary; Bibliography; 2.3 Wavelets in the structure and physics of quasicrystals; 2.3.1 Introduction; 2.3.2 Haar Wavelets for dyadic and Fibonacci tilings; 2.3.3 Haar wavelets on the triangle and the Penrose tiling; 2.3.4 Haar wavelets for the icosahedral Danzer tiling
2.3.5 From Haar wavelets to differentiable spline wavelets2.3.6 Summary and future applications of quasiperiodic wavelets; Bibliography; 2.4 The surface structure of i-Al-Pd-Mn, a modeling approach based on the *((2F)) tiling; 2.4.1 Introduction; 2.4.2 Experiment; 2.4.3 Geometric model for the atomic positions; 2.4.4 Discussion; 2.4.5 Conclusion; Bibliography; 2.5 Structural order of decagonal phases at temperatures up to 1000 °C; 2.5.1 Introduction and aims; 2.5.2 Experimental; 2.5.3 Transient ordering states; 2.5.4 Domain models; 2.5.5 Superlattice formation in d-Al(70+x)Co(y)Ni(30-x-y)
2.5.6 Long-range fluctuations

Sommario/riassunto

Quasicrystals form a new state of solid matter beside the crystalline and the amorphous. The positions of the atoms are ordered, but with noncrystallographic rotational symmetries and in a nonperiodic way. The new structure induces unusual physical properties, promising interesting applications. This book provides a comprehensive and up-to-date review and presents most recent research results, achieved by a collaboration of physicists, chemists, material scientists and mathematicians within the Priority Programme ""Quasicrystals: Structure and Physical Properties"" of the Deutsche Forschungsge