1. Record Nr. UNINA9911019516903321

Autore	Appel Fritz
Titolo	Gamma Titanium Aluminide Alloys : Science and Technology
Pubbl/distr/stampa	Hoboken, : Wiley, 2011
ISBN	3-527-63622-6 3-527-63620-X
Descrizione fisica	1 online resource (1537 p.)
Altri autori (Persone)	PaulJonathan David Heaton OehringMichael
Disciplina	620.189322
Soggetti	Titanium -- Industrial applications Titanium alloys Titanium
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Cover; Related Titles; Title page; Copyright page; Preface; Figures - Tables Acknowledgement List; 1 Introduction; 2 Constitution; 2.1 The Binary Ti-Al Phase Diagram; 2.2 Ternary and Multicomponent Alloy Systems; 3 Thermophysical Constants; 3.1 Elastic and Thermal Properties; 3.2 Point Defects; 3.3 Diffusion; 4 Phase Transformations and Microstructures; 4.1 Microstructure Formation on Solidification; 4.2 Solid-State Transformations; 5 Deformation Behavior of Single-Phase Alloys; 5.1 Single-Phase (TiAl) Alloys; 5.2 Deformation Behavior of Single-Phase 2(Ti3Al) Alloys; 5.3 /B2 Phase Alloys 6 Deformation Behavior of Two-Phase 2(Ti3Al) + (TiAl) Alloys6.1 Lamellar Microstructures; 6.2 Deformation Mechanisms, Contrasting Single-Phase and Two-Phase Alloys; 6.3 Generation of Dislocations and Mechanical Twins; 6.4 Glide Resistance and Dislocation Mobility; 6.5 Thermal and Athermal Stresses; 7 Strengthening Mechanisms; 7.1 Grain Refinement; 7.2 Work Hardening; 7.3 Solution Hardening; 7.4 Precipitation Hardening; 7.5 Optimized Nb-Bearing Alloys; 8 Deformation Behavior of Alloys with a Modulated Microstructure; 8.1 Modulated Microstructures; 8.2 Misfitting Interfaces 10.4 Fracture Toughness, Strength, and Ductility10.5 Fracture Behavior of Modulated Alloys; 10.6 Requirements for Ductility and Toughness;

10.7 Assessment of Property Variability; 11 Fatigue; 11.1 Definitions; 11.2 The Stress-Life (S-N) Behavior; 11.3 HCF; 11.4 Effects of Temperature and Environment on the Cyclic Crack-Growth Resistance; 11.5 LCF; 11.6 Thermomechanical Fatigue and Creep Relaxation; 12 Oxidation Behavior and Related Issues; 12.1 Kinetics and Thermodynamics; 12.2 General Aspects Concerning Oxidation; 12.3 Summary; 13 Alloy Design; 13.1 Effect of Aluminum Content
13.2 Important Alloying Elements - General Remarks13.3 Specific Alloy Systems; 13.4 Summary; 14 Ingot Production and Component Casting; 14.1 Ingot Production; 14.2 Casting; 14.3 Summary; 15 Powder Metallurgy; 15.1 Prealloyed Powder Technology; 15.2 Elemental-Powder Technology; 15.3 Mechanical Alloying; 16 Wrought Processing; 16.1 Flow Behavior under Hot-Working Conditions; 16.2 Conversion of Microstructure; 16.3 Workability and Primary Processing; 16.4 Texture Evolution; 16.5 Secondary Processing; 17 Joining; 17.1 Diffusion Bonding; 17.2 Brazing and Other Joining Technologies
18 Surface Hardening

Sommario/riassunto

This first book entirely dedicated to titanium aluminide alloys emphasizes the relation between basic research topics and processing technologies for real applications. As such, it covers complex microstructures down to the nanometer scale, titanium aluminide structure/property relationships and the potential in such key industries as aerospace, automotive and power conversion. The result is more detailed coverage of the fundamentals than is otherwise found in typical textbooks, making this relevant reading not only for the Ti-Al research community, but also for a wide range of physical metall