

1. Record Nr.	UNINA9910462871403321
Titolo	Fundamentals of magnesium alloy metallurgy // edited by Mihriban O. Pekguleryuz, Karl U. Kainer and A. Arslan Kaya
Pubbl/distr/stampa	Philadelphia, PA : , : Woodhead Pub., , 2013
ISBN	0-85709-729-6
Descrizione fisica	1 online resource (381 p.)
Collana	Woodhead Publishing Series in Metals and Surface Engineering
Altri autori (Persone)	PekguleryuzMihriban O KainerK. U KayaA. Arslan
Disciplina	669.723
Soggetti	Magnesium alloys - Metallurgy Magnesium - Metallurgy Materials science Electronic books.
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	Cover; Fundamentals of magnesium alloy metallurgy; Copyright; Contents; Contributor contact details; 1 Primary production of magnesium; 1.1 Introduction; 1.2 Raw materials and production methods; 1.3 Chemistry of extraction of magnesium from raw material; 1.4 Fused salt electrolysis; 1.5 Impurity removal chemistry in thermal processing; 1.6 Process equipment; 1.7 Melting, refining and casting magnesium; 1.8 Magnesium alloy powder; 1.9 Future trends; 1.10 Conclusion; 1.11 References; 2 Physical metallurgy of magnesium; 2.1 Introduction; 2.2 Crystal structure and its consequences 2.3 Plastic deformation behaviour of magnesium and its alloys2.4 Critical resolved shear stress (CRSS), slip and twinning; 2.5 Fatigue behaviour; 2.6 Creep behaviour; 2.7 Recrystallization and grain growth; 2.8 Future trends; 2.9 References; 3 Thermodynamic properties of magnesium alloys; 3.1 Introduction; 3.2 Fundamentals of thermodynamics; 3.3 Thermodynamic properties of Mg alloys and compounds; 3.4 First-principles thermodynamics of Mg alloys and compounds; 3.5 Future trends; 3.6 Acknowledgements; 3.7 References; 4 Understanding precipitation processes in magnesium alloys; 4.1

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4.2 Precipitation from supersaturated solid solution4.3 Precipitation hardening magnesium based alloy systems; 4.4 Role of precipitation hardening in the development of high strength magnesium alloys; 4.5 Conclusions and future trends; 4.6 Sources of further information and advice; 4.7 References; 5 Alloying behavior of magnesium and alloy design; 5.1 Introduction; 5.2 Alloy design: solid solution alloying of magnesium; 5.3 Alloy design: compound formation in magnesium alloys; 5.4 The effects of second phases on the mechanical behavior of magnesium; 5.5 Alloying with surface-active elements 5.6 Alloying elements and their effects5.7 Summary: magnesium alloy design to enhance properties; 5.8 References; 6 Forming of magnesium and its alloys; 6.1 Introduction; 6.2 Testing for formability; 6.3 Deformation mechanisms and formability; 6.4 Yield characteristics and drawability; 6.5 Work hardening and stretching; 6.6 Failure strain behaviour, compression, rolling and bending; 6.7 Superplastic deformation and hot forming; 6.8 Hot cracking and extrusion; 6.9 Conclusions: key issues affecting the formability of magnesium; 6.10 Future trends; 6.11 References 7 Corrosion and surface finishing of magnesium and its alloys7. 1 Introduction; 7. 2 Magnesium corrosion in aqueous media; 7. 3 Surface finishing; 7. 4 Implications for improving corrosion resistance and future trends; 7. 5 Conclusions; 7. 6 References; 8 Applications: aerospace, automotive and other structural applications of magnesium; 8.1 Introduction; 8.2 Material properties; 8.3 Alloy development; 8.4 Manufacturing process development; 8.5 Aerospace applications; 8.6 Automotive applications; 8.7 Other applications; 8.8 Future trends; 8.9 Acknowledgements; 8.10 References 9 Applications: magnesium-based metal matrix composites (MMCs)

Sommario/riassunto

Magnesium and magnesium alloys offer a wealth of valuable properties, making them of great interest for use across a wide range of fields. This has led to extensive research focused on understanding the properties of magnesium and how these can be controlled during processing. Fundamentals of magnesium alloy metallurgy presents an authoritative overview of all aspects of magnesium alloy metallurgy, including physical metallurgy, deformation, corrosion and applications. Beginning with an introduction to the primary production of magnesium, the book goes on to discuss physical metallurgy

2. Record Nr.	UNINA9910813553203321
Autore	Guichard Jean-Paul
Titolo	L'affirmation de l'Europe byzantine (1796-1914) : la Russie, les Balkans et le pangermanisme // Jean-Paul Guichard
Pubbl/distr/stampa	Paris : , : L'Harmattan, , [2018] ©2018
ISBN	2-336-85536-4
Descrizione fisica	1 online resource (190 pages)
Collana	Collection Questions contemporaines
Disciplina	327.4
Soggetti	Europe Foreign relations
Lingua di pubblicazione	Francese
Formato	Materiale a stampa
Livello bibliografico	Monografia