

Table of Contents

Preface

Chapter 1: Alloy Development

Phase Diagram of Mg-Zn-Gd System Alloy at Mg Rich Corner and its Application in the Development of Two New Alloys	
Y.C. Guo, J.P. Li, J.S. Li, Z. Yang and P. Wang	3
Castable Aluminium Alloys for High Temperature Applications	
Y.Y. Fan and M.M. Makhlof	8
Energy Efficient Technology for Al–Cu–Mn–Zr Sheet Alloys	
N.A. Belov and A.N. Alabin	13
Compositional Effects on the Restoration Behaviour in Mg-Zn-RE Alloys	
N.G. Ross, M.R. Barnett and A.G. Beer	18
Effect of Ti Addition on Mechanical Properties of High Pressure Die Cast Al-Mg-Si Alloys	
S. Ji, D. Watson, Y. Wang, M. White and Z.Y. Fan	23
Microstructure, Mechanical and Corrosion Properties of Mg-Gd-Zn Alloys	
A. Srinivasan, Y.D. Huang, C.L. Mendis, H. Dieringa, C. Blawert, K.U. Kainer and N. Hort	28
Effect of Addition of Al & Ca and Heat Treatment on the Cast Mg-6Zn Alloy	
S.S. Joshi, M.S. Mohan, S. Seshan, S. Kumar and S. Suwas	33
Development and Property Evaluation of Low-Si Aluminum Casting Alloys for Thermal Dissipation	
J.S. Shin, K.T. Kim, D.J. An and S.Y. Ko	38
Influence of Iron on the Size and Distribution of Metallic Lanthanum Particles in Free-Machining Titanium Alloys Ti 6Al 7Nb xFe 0.9La	
F. Brunke, E. Meyer-Kornblum and C. Siemers	42
Recent Achievements and Future Challenges for R&D on Aluminium Alloys and Processing	
H. Kaufmann	47
Development of a High Strength Cast Aluminium Alloy for Possible Automotive Applications	
M.C. Shaji, K.K. Ravikumar, M. Ravi and K. Sukumaran	54
Effects of Bismuth on the Microstructure and Mechanical Properties of AlSi9Cu3(Fe) Die Casting Alloys	
S. Ferraro, G. Timelli and A. Fabrizi	59
Effect of Excess Mg on the Microstructure and Mechanical Properties of Al-Mg₂Si High Pressure Die Casting Alloys	
F. Yan, S. Ji and Z.Y. Fan	64
Creep Behaviour Under Compressive Stresses of Calcium and Barium Containing Mg-Al-based Die Casting Alloys	
H. Dieringa, D. Zander and M.A. Gibson	69

Chapter 2: Casting & Solidification

Improvement of the Interdependence Analytical Model through Selection of Interfacial Growth Rates during the Initial Transient	
A. Prasad, L. Yuan, P.D. Lee and D.H. St. John	77
Effect of Combined Electromagnetic Fields on the Structure of a HDC Casting 2024 Al Alloy Ingot	
Q.F. Zhu, Z.H. Zhao, Y.B. Zuo, L. Li and J.Z. Cui	82
Preliminary Design and Assessment of a Novel Electromagnetic Edge Dam for Aluminium Twin Roll Casting	
M. McBrien and J. Allwood	87
A Model of Inclusion Behaviour in Liquid Aluminium	
D.J. Burnard and W.D. Griffiths	92

Refinement of the Microstructure of an Al-Mg₂Si Hypereutectic Alloy by Intensive Melt Shearing	97
H.T. Li, G. Scamans and Z.Y. Fan	
Exploring the Use of a Synchrotron X-Ray Scattering Method to Investigate Nucleation	102
A. Brown, H.B. Dong, P. Howes and C. Nicklin	
Effect of Si Content on the Size of Fe-Rich Intermetallic Particles in Al-xSi-0.8Fe Alloys	107
T. Sivarupan, C.H. Caceres and J.A. Taylor	
Comparing the SEED Semi-Solid Process to Low Pressure Permanent Mould in the Production of 4mm Thick Aluminum A356 Covers	112
F. Chiesa, D. Levasseur and J. Baril	
Effect of Ca Level on the Formation of Silicon Phases during Solidification of Hypereutectic Al-Si Alloys	117
K. Al-Helal, Y. Wang, I. Stone and Z.Y. Fan	
A Brief History of the Grain Refinement of Cast Light Alloys	123
D.H. St. John, M.A. Easton, P. Cao, M. Bermingham and M. Qian	
Study of the Effect of Cooling Rate on Eutectic Modification in A356 Aluminium Alloys	130
D. Ferdian, J. Lacaze, I. Lizarralde, A. Niklas and A.I. Fernandez-Calvo	
The Effect of Superheating and Cooling Rate on Primary Precipitation of Si in Hypereutectic Al-Si Alloys	135
S. Saleem and H. Fredriksson	
Modification of a Hypereutectic Aluminium Silicon Alloy under the Influence of Intensive Melt Shearing	140
Y.B. Zuo, Z.Y. Fan, Q.F. Zhu, L. Lei and J.Z. Cui	
Grain Refiner Development for Al Containing Mg Alloys	145
L. Bolzoni, M. Nowak, F. Yan and N. Hari Babu	
Focused Ion Beam Milling and Imaging: An Advanced Method to Detect Fine Inclusions in Cast Aluminium Alloys	150
K.H. Kim, N.R. Green and W.D. Griffiths	
Simulation of Cold Shuts and Misruns in Centrifugal Casting of TiAl Low Pressure Turbine Blades	155
S. Jana, J. Jakumeit, R. Tiefers and T. Stoyanov	
Modelling Eutectic Growth in Unmodified and Modified Near-Eutectic Al-Si Alloy	160
N.S. Tiedje, J.H. Hattel, J.A. Taylor and M.A. Easton	
DC Casting of Large Sized Ingot of a High Strength 7xxx Alloy under the Influence of Electromagnetic Field	165
J.Z. Cui, H.T. Zhang and Y.B. Zuo	
Melt Conditioned Twin Roll Casting (MC-TRC) of Thin Mg-Alloy Strips for Direct Stamping of Mg Components	170
S. Das, S. Ji, O. El Fakir, L.L. Wang, J.P. Dear, J.G. Lin, I. Stone, G. Scamans and Z.Y. Fan	
Application Research on DC Casting Process by Annular Electromagnetic Stirring for a Modified 7075 Alloy	175
J. Xu, H.J. Wang, M.O. Tang and Z.F. Zhang	
Comparison of Oxide Thickness of Aluminium and the Effects of Selected Alloying Additions	180
E.M. Hinton, W.D. Griffiths and N.R. Green	
Microstructural Modeling of Mg Alloys and Experimental Validation	185
M. Paliwal, Y.B. Kang, E. Essadiqi and I.H. Jung	
Ultrafast X-Ray Imaging and Modelling of Ultrasonic Cavitations in Liquid Metal	190
T.L. Lee, J.C. Khong, K. Fezzaa and J.W. Mi	
Melt Quenched High Pressure Die Casting (MQ-HPDC) of an A356 Alloy	195
S. Ji, B. Jiang, W.C. Yang and Z.Y. Fan	
Plasma Treatment Casting of Cast Aluminum 6XXX Wrought Alloys	200
M. Bamberger and E. Kiperwasser-Karbjan	
Influence of Process Parameters on Twin Roll Cast Strip of the Alloy AZ31	205
G. Kurz, J. Bohlen, D. Letzig and K.U. Kainer	
A Synchrotron X-Ray Radiography Investigation of Induced Dendrite Fragmentation in Al-15wt%Cu	210
E. Liotti, A. Lui, R. Vincent, S. Kumar, Z.P. Guo, T. Connolley, M. Hart, L. Arnberg, R.H. Mathiesen and P.S. Grant	

Relationship between Growth Rates and Dendritic Microstructure Parameters in Al-5wt. Zn Binary Alloy	215
E. Acer, H. Erol and M. Gündüz	
Characterisation of Oxide Films in Al-Mg Alloy Melts	220
Y. Wang, H.T. Li, Z.Y. Fan and G. Scamans	
Modelling of the Effects of Entrainment Defects on Mechanical Properties in a Cast Al-Si-Mg Alloy	225
Y. Yue, W.D. Griffiths and N.R. Green	
High Speed Imaging Study of the Dynamics of Ultrasonic Bubbles at a Liquid-Solid Interface	230
D.Y. Tan and J.W. Mi	
Effect of Travelling Magnetic Fields on the Dendritic Microstructure of AlSi and AlSiMn	235
A. Orth and L. Ratke	
Material Properties of Cast Aluminium Alloys Produced by Various Casting Processes	241
M. Okayasu, K. Ota, S. Takeuchi and T. Shiraishi	
Study of Mechanical Properties of an LM24 Composite Alloy Reinforced with Cu-CNT Nanofillers, Processed Using Ultrasonic Cavitation	245
A. Miranda, N. Alba-Baena, B.J. McKay, D.G. Eskin, S.H. Ko and J.S. Shin	
Catalytic Effect of Nanoparticles on Primary and Secondary Phase Nucleation	250
M.P. de Cicco and J.H. Perepezko	
Practical Considerations on the Application of Ultrasonic Treatment to Mg-Al Shape Castings	255
E. Pucina, G. de Looze, D. Tomus, M.A. Easton, A. Schiff and D.H. St. John	
A Study of the Behaviour of Double Oxide Films in Al Alloy Melts	260
M. El-Sayed, H.G. Salem, A. Kandeil and W.D. Griffiths	
Assessment of Quality when Delivering Molten Aluminium Alloys Instead of Ingots	266
A. Bjurenstedt, S. Seifeddine and T. Liljenfors	
Effect of Ultrasonic Melt Treatment on Degassing and Structure of Aluminium Alloys	271
N. Alba-Baena, T. Pabel, N. Villa-Sierra and D.G. Eskin	
Determination of the Magnitude of Interfacial Air-Gap and Heat Transfer during Ingot Casting into Permanent Metal Moulds by Numerical and Experimental Techniques	276
J. Swan, M. Ward and R.C. Reed	
A Finite-Volume Model for Numerical Solidification of Mg Alloys	281
M. Farroknejad, A. Straatman and J. Wood	
Study of the Solidification of AS Alloys Combining <i>In Situ</i> Synchrotron Diffraction and Differential Scanning Calorimetry	286
D. Tolnai, G. Szakács, G. Requena, A. Stark, N. Schell, K.U. Kainer and N. Hort	
Solidification Mechanisms in Melt Conditioned Direct Chill (MC-DC) Cast AZ31 Billets	291
M.X. Xia, A.K. Prasada Rao and Z.Y. Fan	
Microstructural and Mechanical Characterization of AM60B Alloy Cast by RSF Process	296
F. Bassan and G. Timelli	
Production of High Purity Mg-X Rare Earth Binary Alloys Using Zr	301
A. Prasad, P.J. Uggowitzer, Z.M. Shi and A. Atrens	
Influences of Y Additions on the Hot Tearing Susceptibility of Mg-1.5wt.%Zn Alloys	306
Z. Wang, Y.D. Huang, A. Srinivasan, Z. Liu, K.U. Kainer and N. Hort	
Influence of a Novel Master Alloy Addition on the Grain Refinement of Al-Si Cast Alloys	311
L. Bolzoni, M. Nowak and N. Hari Babu	
Vacuum Induction Melting of TiNi Alloys Using BaZrO₃ Crucibles	316
Z. Zhang, F.Y. Xing, M. Zhu, K.L. Zhu, X.G. Lu, G.X. Wu and C.H. Li	
Effect of A-EMS Melt Treatment Process on Microstructure and Property of Squeeze Casting Al-Zn-Mg-Cu-Sc Alloys	321
Z.F. Zhang, Z.G. Wang, B. Li, J. Xu and R. Wang	
The Response of Entrainment Defect Distribution to Varied Fluid Flow Parameters in the High Pressure Die Casting of Al Alloys	326
R. Watson, T. Zeguer, M. Buckley, N.R. Green, S. Ruffle and W.D. Griffiths	
Design of a Composite Roll with Internal Cooling Channels for Twin-Roll Casting	331
J.J. Park	

Effect of Intensive Melt Shearing and Zr Content on Grain Refinement of Mg-0.5Ca-xZr Alloys

G.S. Peng, Y. Wang and Z.Y. Fan

336

Chapter 3: Forming

FEA Modelling of Cutting Force and Chip Formation in Thermally Assisted Machining of Ti6Al4V Alloy

Y. Xi, M. Birmingham, G. Wang and M. Dargusch

343

Characterizing the Asymmetric/Anisotropic Deformation Response and Forming Behaviour of Wrought Magnesium and Titanium Alloys

B.W. Williams and L. Blaga

348

Manufacture of CNTs-Al Powder Precursors for Casting of CNTs-Al Matrix Composites

S.Y. Ko, B.Y. Kim, Y.I. Kim, T.Y. Kim, K.T. Kim, B.J. McKay and J.S. Shin

353

Evolution of Near-Surface Deformed Layers on AA3104 Aluminium Alloy

K. Li, X.R. Zhou, G.E. Thompson, J.A. Hunter and Y.D. Yuan

358

Influence of Groove Pressing Process on the Drawability (*R* Value) of Aluminium Alloy AA 5052 Sheets

E. Jain and U. Chakkingal

363

Numerical Investigation on the Hot Forming and Cold-Die Quenching of an Aluminium-Magnesium Alloy into a Complex Component

O. El Fakir, S.H. Chen, L.L. Wang, D. Balint, J.P. Dear and J.G. Lin

368

A Review of Cooling Technologies for Flat Rolled Aluminium Products

P. Christoforou

373

Formation of Bulk Nanostructured Al₃Ni from Elemental Micropowders Using High-Pressure Torsion

A. Alhamidi, K. Edalati and Z.J. Horita

378

Processing of Elemental Titanium by Powder Metallurgy Techniques

L. Bolzoni, E.M. Ruiz-Navas and E. Gordo Odériz

383

Tailoring Microstructure and Mechanical Properties of 6063 Aluminium Alloy for Lightweight Structural Parts

W. Chrominski, M. Kulczyk, M. Siwek and M. Lewandowska

388

Novel Forming of Ti-6Al-4V by Laser Engineered Net Shaping

Y.W. Zhai and D.A. Lados

393

Effect of Strain and Strain Rate on the Evolution of Dispersoid Particles in Al-Mn-Fe-Si Alloy during Hot Deformation

T. Hill, J.D. Robson and N. Kamp

398

Microstructural and Mechanical Characterization of ARB AZ31

F. Schwarz, K. Lange, L. Krüger, R. Kawalla and S. Reichelt

403

Strengthening of Al 6061 Alloy by High-Pressure Torsion through Grain Refinement and Aging

I. Fadhlina Mohamed, S. Lee and Z. Horita

408

Processing of Ti Alloys by Additive Manufacturing: A Comparison of the Microstructures Obtained by Laser Cladding, Selective Laser Melting and Electron Beam Melting

S. Reginster, A. Mertens, H. Paydas, J. Tchouifang Tchuindjang, Q. Contrepois, T. Dormal, O. Lemaire and J. Lecomte-Beckers

413

Forming Behaviour of Al-TiC *In Situ* Composites

R.N. Rai, A.K.P. Rao, G.L. Dutta and M. Chakraborty

418

The Strength and Ductility of 5483 Aluminium Alloy Processed by Various SPD Methods

P. Bazarnik, B. Romelczyk-Baishya, M. Kulczyk and M. Lewandowska

423

Integrated Modeling of Strength Evolution in Al-Mg-Si Alloys during Hot Deformation

E. Kabliman and P. Sherstnev

429

Cryo-Rolling and Formability of 2024 Aluminium

A.S. Taylor, M. Weiss, T. Hilditch, P. Hodgson and N. Stanford

434

Process Optimization and Microstructure Control for Twin Screw Rheo-Extrusion of an AZ91D Magnesium Alloy

Z. Cassinath, M.X. Xia, Y. Huang and Z.Y. Fan

439

The Effect of Particles on Microstructure and Mechanical Behaviour of Mg-10Gd-3Y-0.4Zr Alloy Processed by ECAP	444
Y.P. Zhou, D.J. Li, X.Q. Zeng and W.J. Ding	

Chapter 4: Heat Treatment & Phase Transformations

Constituent Particles and Dispersoids in an Al-Mn-Fe-Si Alloy Studied in Three-Dimensions by Serial Sectioning

L. Dwyer, J.D. Robson, J.Q. da Fonseca, N. Kamp, T. Hashimoto and G.E. Thompson	451
---	-----

Artificial Ageing Behaviour of Al-4Zr Micro Sheets

R. von Bargen, A. von Hehl and H.W. Zoch	456
--	-----

Study of Dynamic Precipitation during Hot Deformation of Mg-Al-Sn Alloys

A.S.H. Kabir, J. Su, I.H. Jung and S. Yue	461
---	-----

Heat Treatment of Magnesium Alloys – Current Capabilities

F. Czerwinski and W. Kasprzak	466
-------------------------------	-----

Effect of Selected Alloying Elements on Aluminium Physical Properties and its Effect on Homogenization after Casting

T. Knych, A. Mamala and W. Ścieżor	471
------------------------------------	-----

Thermodynamics-Integrated Simulation of Precipitate Evolution in Al-Mg-Si-Alloys

E. Povoden-Karadeniz, P. Lang, K.I. Öksüz, W. Jun, S. Rafiezadeh, A. Falahati and E. Kozeschnik	476
---	-----

Age Hardening of Mg-3Zn-xCa (X = 0, 0.5, 1.0) wt.% Alloys

K. Kubok, L. Litynska-Dobrzańska, A. Wierzbicka-Miernik and J. Wojewoda-Budka	481
---	-----

Microstructure Evolution and Mechanical Properties of an Al-Si-Cu-Mg-Ni Aluminium Alloy after Thermal Exposure

F. Xia, J.P. Li, Y.C. Guo and Z. Yang	486
---------------------------------------	-----

Effect of Grain Size and Structure, Solid Solution Elements, Precipitates and Twinning on Nanohardness of Mg-RE Alloys

P. Maier, A. Richter, G. Tober and N. Hort	491
--	-----

Effect of Heat Treatment on the Mechanical Properties of Wrought Al-Zn-Mg-Cu Alloy Cast by Rapid Solidification

D. Kapinos, M. Szymanek, B. Augustyn and M. Gawlik	496
--	-----

Three Dimensional Imaging of Light Metals Using Serial Block Face Scanning Electron Microscopy (SBFSEM)

T. Hashimoto, G.E. Thompson, M. Curioni, X.R. Zhou and P. Skeldon	501
---	-----

Effect of Heat Treatment and Thermal Exposure on Microstructure of the Alloy C⁺ Bars

X.X. Wang, W.Q. Wang and Y.Q. Zhang	506
-------------------------------------	-----

Evolution of Microstructure and Mechanical Properties of the Thixo-Diecast 319s Alloy during Heat Treatment

D.Q. Li, X.K. Liang, F.B. Yang, Y.F. He, F. Zhang, Q. Zhu and S.M. Zhang	511
--	-----

Anisotropic Diffusion Behaviour of Al and Zn in HCP Mg: Diffusion Couple Experiment Using Mg Single Crystal

S.K. Das, Y.M. Kim, T.K. Ha, R. Gauvin and I.H. Jung	516
--	-----

Microstructures and Mechanical Properties of a Novel Mg-Gd-Y-Zn-Zr Alloy

Z. Yang, J.P. Li, Y.R. Wang and B.W. Xiong	521
--	-----

Chapter 5: Mechanical Behaviour

Recrystallization and Grain Growth Related Texture and Microstructure Evolution in Two Rolled Magnesium Rare-Earth Alloys

I. Basu, T. Al Samman and G. Gottstein	527
--	-----

Investigation of Twinning Activity in Magnesium Using Advanced *In Situ* Methods

K. Māthis, J. Čapek, P. Lukáš, D.W. Brown and B. Clausen	532
--	-----

Acoustic Emission Study of Mg-Mn Extruded Alloys with Prospective Mechanical Properties

K. Illková, F. Chmelík, P. Dobron, J. Bohlen, D. Letzig and K.U. Kainer	537
---	-----

High Temperature Mechanical Properties of Sand-Cast Mg-Gd-Y Magnesium Alloy

W.C. Liu, L. Cao, S. Zhang, H.R.J. Nodooshan, G.H. Wu and W.J. Ding	543
---	-----

The Effect of Aluminium on Deformation and Twinning in Alpha Titanium: The 45° Case	549
A. Fitzner, D.G.L. Prakash, J.Q. da Fonseca, M. Preuss, M.J. Thomas, S.Y. Zhang and J. Kelleher	
Wear Behaviour of A356 Aluminium Alloy Reinforced with Micron and Nano Size SiC Particles	554
S.T. Camagu, G. Govender and H. Möller	
High Strength and High Ductility in Nanostructured Aluminium-Based Intermetallics Produced by High-Pressure Torsion	558
K. Edalati and Z.J. Horita	
Tension-Tension Fatigue Behaviour of Carbon Nanotube Reinforced Aluminium Composites	
J.Z. Liao, M.J. Tan and E. Bayraktar	563
Compressive Creep Behaviour of Extruded Mg-10Gd-3Y-0.5Zr (wt.%) Alloy	568
H. Wang, Q.D. Wang, B. Ye, D.D. Yin and J. Yuan	
Fatigue Crack Growth in Cast and Wrought Aluminium Alloys	574
A. Gavras, A. Spangenberger and D.A. Lados	
Reducing Mechanical Asymmetry in Wrought Magnesium Alloys	580
J.D. Robson	
Modelling Creep Induced by Machining Residual Stresses in Aluminium Alloys	
T. Spence and M.M. Makhlof	585
Crashworthiness of Magnesium Sheet Structures	
D. Steglich, J. Bohlen, X.W. Tian, S. Riekehr, N. Kashaev, S. Bargmann, D. Letzig, K.U. Kainer and N. Huber	590

Chapter 6: Corrosion & Surface Modification

Extending the Life of Light Alloy Components: Microstructure, Corrosion, Inhibition and Performance Assessment	
M. Curioni, A.C. Balaskas, T. Hashimoto, A.I. Egbeolu and G.E. Thompson	597
Development of Non Chromate Conversion Coatings on AZ31 Alloy: Effect of Nickel Overcoat	
J. Hazan and M. Bamberger	602
Influence of Microstructure on the Corrosion Resistance of AZ91D after EB Surface Alloying	
K. Fritzsch, A. Buchwalder, R. Zenker and M. Klemm	607
Effect of Zn Content on the Microstructure and Corrosion Behaviour of Mg-7Y-0.6Zr Alloy	612
J.L. Wang, J.P. Li, P. Wang, Y.C. Guo and Z. Yang	
Comparison of Corrosion Resistance of High Pressure Die-Cast and Semi-Solid Cast AZ91, AM60, Alloys and Respective Anodic Oxides	
C. Genoni, A. da Forno and M. Bestetti	618
Relating Grain Misorientation to the Corrosion Behaviour of Low Copper 7xxx Aluminium Alloys	
A. Cassell, G.E. Thompson, X.R. Zhou, T. Hashimoto and G. Scamans	623
Corrosion of an Advanced Al-Cu-Li Alloy for Aerospace Applications	
D.M. Carrick, S. Hogg and G.D. Wilcox	629
Improving Corrosion Resistance of AA2014 Welds with Micro Arc Oxidation	
R. Jacob, S.A. Srinivasan, K. Sivaprasad and V. Muthupandi	634
Corrosion Resistance of Al-12Si Coatings on AZ91 Magnesium Alloy Prepared through Flame Spray	
P.H. Gao, J.P. Li, Z. Yang, Y.C. Guo and Y.R. Wang	639
Electrochemical Corrosion Behaviour of WE54 Magnesium Alloy	
O. Kazum, M.B. Kannan, N. Scharnagl, C. Blawert and Y.H. He	644
Galvanic Corrosion between Magnesium Alloys and Steel	
J. Janiec-Anwar, G.E. Thompson, X.R. Zhou, M. Curioni, M. Turski and T. Wilks	648
Consequences of Micro-Milled and Laser Structured Surfaces of CP-Titanium on Tension-Compression Fatigue Behaviour	
C. Kühn and E. Kerscher	653
Anodising of Al-Mg-Si-(Cu) Alloys Produced by R-HPDC	
L. Chauke, H. Möller, U.A. Curle and G. Govender	658

Influence of the Organic Additions on Structure, Corrosion Resistance and Tribological Properties of Ni/Al₂O₃ Composite Coatings	663
M. Nowak, M. Opyrchał, S. Boczkal and J. Zielechowski	
Effect of Yttrium Ion on YSZ-Al₂O₃ Composite Coating Formed by PEO on a Cast Al-Si-Cu-Ni Alloy	668
P. Wang, D.X. Liu, J.P. Li, Y.C. Guo and Z. Yang	
Improving Corrosion Resistance of Mg10Gd Alloy	673
M.D.R. Silva Campos, N. Scharnagl, C. Blawert and K.U. Kainer	
Relationship between Laser Parameters - Microstructural Modification - Mechanical Properties of Laser Surface Melted Magnesium Alloy AZ91D	678
C. Taltavull, B. Torres, A.J. Lopez and J. Rams	
Microstructure and Microgalvanic Corrosion of an Extruded Mg-10Gd-2Y-0.5Zr Magnesium Alloy	683
J.P. Li, P. Wang, Y.C. Guo, G.E. Thompson, X.R. Zhou, S. Zhong and T. Hashimoto	
Role of Electric Pulse Duty and Frequency on Properties of Micro-Arc Oxidized Titania Films Developed on Ti-6Al-4V	688
K. Venkateswarlu, S. Suresh, R. Nagumothu, D. Sreekanth and M. Sandhyarani	
Novel Environmentally-Friendly Coatings for Aerospace Alloys	693
J.M. Harris, X.R. Zhou, G.E. Thompson, P. Scott, X.Y. Zhang, Z.C. Shi and Z.H. Sun	
Surface Reactivity of Magnesium Alloys in Solid and Liquid States	698
F. Czerwinski	
Research on Microstructure and Tribological Properties of the Cp/AlSn Coatings Deposited by Magnetron Sputtering	703
Q.Q. Guo, J.P. Li and Y.C. Guo	

Chapter 7: Joining

Comparative Study of Different Interfaces of Steel Inserts in Aluminium Castings	711
E. Aguado, A. Baquedano, U. Uribe, A.I. Fernandez-Calvo and A. Niklas	
Enhanced Mechanical Properties of AA5083 GTA Weldments with Current Pulsing and Addition of Scandium	716
N.K. Babu, P.Y. Bhikanrao and K. Sivaprasad	
Automotive Structures: Design for Disassembly and the Role of Adhesive Bonding	721
A. Hutchinson, P.H. Winfield and D. Morrey	
The Effect of Friction Stir Process (FSP) on the Microstructure and Mechanical Properties of Mg-Gd-Ag-Zr Alloy	726
F.Y. Zheng, L.M. Peng, Y.J. Wu, X.W. Li, Y. Zhang and W.J. Ding	
Formation of Intermetallic Compounds in Dissimilar Friction Spot Weld of Al to Mg Alloys	731
U. Suhuddin, V. Fischer and J. dos Santos	
Enhanced Performance of Steel-Aluminium Cast Nodes through Cold Metal Transfer	736
S. Ucsnik, R. Gradinger, A. Becirovic and A. Waldhör	
Friction Stir Processing in Wrought and Cast Aluminum Alloys	741
Y. Cao and D.A. Lados	
Influence of Rivet Tip Geometry on the Joint Quality and Mechanical Strengths of Self-Piercing Riveted Aluminium Joints	746
D.Z. Li, L. Han, M. Shergold, M. Thornton and G. Williams	
Investigation of Fusion Weldments of Semi-Solid Aluminium A356 Alloy: Pool Geometry and Microstructure	751
S. Sandhya and G. Phanikumar	
Hot Cracking Susceptibility in the TIG Joint of AZ31 Mg-Alloy Plates Produced by the TRC Process with and without Intensive Melt Shearing	756
X.H. Xue, Y. Wang, I. Stone and Z.Y. Fan	
High Strength Aluminium Sheet Metal Joining by Resistance Spot Welding	761
R. Gradinger, N. Sotirov, G. Rettenbacher, C. Pangerl, P. Dörner, S. Minichshofer, A. Becirovic, C. Melzer and D. Uffelmann	
Disbonding Technology for Adhesive Reversible Assembly in the Automotive Industry	766
D.D. Rodrigues, P.H. Winfield and D. Morrey	

Mechanical and Microstructural Characterization of Percussive Arc Welded Hyper-Pins for Titanium to Composite Metal Joining

R.J. Oluleke, D. Strong, O. Ciucă, J. Meyer, A. de Oliveira and P.B. Prangnell

771

Microstructure and Mechanical Properties of Refilled Friction Stir Spot Welding of Commercial Pure Aluminium

S. Venukumar, S. Muthukumaran and Y. Swaroop

776

Chapter 8: Applications

Effect of Aging on Conductivity of Heat Resistant Overhead Line Conductors

H. Tecer, E. Acer, H. Erol and M. Gündüz

783

Investigation of the Microstructure and Bio-Corrosion Behaviour of Mg-Zn and Mg-Zn-Ca Alloys

Y. Lu, A. Bradshaw, Y.L. Chiu and I. Jones

788

Tensile Strength of Al-Zr Overhead Line Conductors

H. Erol, H. Tecer, E. Acer, C. Kadioğlu and M. Gündüz

793

Peeling of Aluminium Tubes as an Efficient Method for Energy Absorption in Vehicle Front Structures

E. Beeh, H.E. Friedrich, M. Kriescher, P. Straßburger, G. Kopp, P. Zhou, H. Kraft and H. Abu El-Hija

798

In Vitro Evaluation of Degradation of Biodegradable Silane Based Coating on Mg-Zn-Ca Alloy in a Physiological Environment

G. Swati, A.S. Khanna and R.K. Singh Raman

803

Rheological Inactivity of AIMgSi Conductors (AAAC) in Trend of Negative Stress Gradients

B. Smyrak, T. Knych, A. Mamala and K. Korzeń

808

Characterization of an Mg-2Zn-1Ca 1 β -TCP Composite Fabricated by High Shear Solidification and ECAE

Y. Huang, D.B. Liu, M.X. Xia and L. Anguilano

813

Enhanced Battery Pack for Electric Vehicle: Noise Reduction and Increased Stiffness

M. Hartmann, M. Roschitz and Z. Khalil

818

Effect of Precipitation Hardening on the Structure and Properties of Al-Mg-Si Conductor Alloys in Different Technological Routes

P. Osuch, B. Smyrak and T. Knych

823

Plasma Electrolytic Oxidation and Characterization of Spark Plasma Sintered Magnesium/Hydroxyapatite Composites

R. Viswanathan, R. Nagumothu, S. Kennedy, D. Sreekanth, K. Venkateswarlu, M. Sandhya Rani and V. Muthupandi

827