

Table of Contents

Preface

Chapter 1: Aluminium Matrix Composites

Synthesis and Characterization of Aluminum Matrix Composites Reinforced with SiC-Graphene Core-Shell Nanoparticles J.S. Zhang, Z.X. Chen, J.W. Zhao and Z.Y. Jiang	3
Effect of Stainless Steel Flakes Content on Mechanical Properties and Microstructure of Cast 96.66% Pure Aluminum G.V. Seretis, A.K. Polyzou, D.E. Manolakos and C.G. Provatidis	8
Experimental Investigation on Mechanical and Wear Properties of Al7075-B₄C-TiO₂ Composite M. Ganesh, D. Srinivasan and N. Vivekanandan	17
Production of Aluminium Based MMCs by Short-Time Ammonia Gas Flow Milling E.S. Caballero, R. Astacio, F.J.V. Reina, J.M. Montes and J. Cintas	24
Semi-Solid Processing of Nano-SiC_p/ Al-Si Composites and Mechanical Properties with Rheo-Casting S.S. Wu, D. Yuan, Q. Chen, S.L. Lü and Z.W. Huang	29
Effect of Silicon Nitride (Si₃N₄) Addition on the Mechanical and Tribological Performance of Al-Fe-Si Alloy (AA8011) J. Fayomi, A.P.I. Popoola, O.M. Popoola and O.P. Oladijo	35
Hybrid Effect of ZrB₂+Si₃N₄ on the Microstructure and Mechanical Properties of AA8011 for Service Life Improvement J. Fayomi, A.P.I. Popoola and O.M. Popoola	40
Multiscale Finite Element Simulation of Thermal Properties and Mechanical Strength of Reduced Graphene Oxide Reinforced Aluminium Matrix Composite P. Nyanor, O.A. El Kady, A.S. Hamada, K. Nakamura and M.A. Hassan	45
Effect of Cast Geometries on Particle Dispersion in Metal Matrix Composites V. Mehta, R. Patel and M. Sutaria	53
Effect of ZnO Particles on Microstructure, Microhardness and Wear Behaviour of AA7068 Metal Matrix Composites Synthesized by Powder Metallurgy K.J. Joshua, S.J. Vijay, P. Ramkumar and S. Mohanasundaram	59
Investigation of the Creep Resistance of a Spray-Compacted Si-Particle Reinforced Al-Based MMC (Disp^{al}® S270) U. Tetzlaff, A. Gerber, R. Amelang and G. Lemos	65
Mechanical Properties of Nano SiC-Reinforced Aluminum A356 Fabricated by Stir Casting Method D. Dhaneswara, L.N. Andani, N. Sofyan and A. Zulfia	72
Evaluation of Wear Rate of Aluminium Hybrid Composites Fabricated through Stir Casting Technique B. Venkatesh and S. Nagakalyan	79
Erosion-Corrosion Behavior of Al-20%Ni-Al₂O₃ Metal Matrix Composites by Stir Casting N.M. Dawood	85
Effect on the Mechanical Properties of Aluminum-Based Hybrid Metal Matrix Composite Using Stir Casting Method R. Butola, C. Pratap, A. Shukla and R.S. Walia	99
Synthesis and Mechanical Property Evaluation of Hot Forged Aluminium Alloy Reinforced with Nano Alumina S. Ghanaraja, R. Madhu, K.S. Ravikumar and P. Likith	106
Experimental Study Pertaining to Microwave Sintering (MWS) of Al-Metal Matrix Composite - A Review H. Singh, P.K. Jain, N. Bhoi and S. Pratap	112
Microstructural Characterization of Microwave Processed Al-SiC_p Metal Matrix Composites Subjected to Extrusion C. Honnaiah, M.S. Ashok Kumar, M.S. Srinath and S.L.A. Prasad	118

Effect of Processing Conditions on Bonding Strength at Al(Si)/Diamond Interfaces C. Edtmaier, J. Segl, R. Koos, M. Schöbel and C. Feldbaumer	125
Determination on the Effect of Al₂O₃/B₄C on the Mechanical Behaviour of Al-6.6Si-0.5Mg Alloy Cast in Permanent Mould A.V.R. Senan, M.C. Akshay and K.V. Shankar	131
Processing of Nickel-Copper Coated Carbon Fibre Rods Reinforced Al6082/4% Al₂O₃/2%Gr Matrix Composites M. Srinivasu, R. Suresh and L. Shivaramu	137
On the Study of a TiB₂ Nanoparticle Reinforced 7075Al Composite with High Tensile Strength and Unprecedented Ductility Y. Ma, G. Ji, Z. Chen, A. Addad and V. Ji	142
Additive Manufacturing of a CNT/Al6Si Composite with the Nanolaminated Architecture via Cold Spray Deposition X.L. Xie, Y.C. Xie, Z.Q. Tan, C.Y. Chen, J. Wang, Z.Q. Li, X.P. Li, G. Ji and H.L. Liao	148
Evaluation of Effective Thermal Conductivity of Metal Matrix Composites by Using Image-Based Calculation K. Sugio, K. Kono, Y.B. Choi and G. Sasaki	153
Development and Characterization of Al₂O₃ and SiC Reinforced Al-Cu Metal Matrix Hybrid Composites B. Behera, R.P. Dalai, D.K. Mishra and S.K. Badjena	158
Rice Husk Ash Reinforced Aluminium Metal Matrix Composites: A Review Z. Seikh, M. Sekh, S. Kunar, G. Kibria, R. Haque and S. Haidar	165
Density, Hardness, and Wear Responses of Rice Husk Ash Reinforced Aluminium Composites Z. Seikh, M. Sekh, G. Kibria, R. Haque and S. Haidar	181
Wear Characteristics of Al7075/Al₂O₃/SiC Hybrid Metal Matrix Nano Composites N. Sreedhar	193
Synthesis and Characterization of Novel Nickel Coated Carbon Fibre Rod Reinforced Aluminium Metal Matrix Composite Material for using in Automobile Application R.D. Sandhanshiv and D.M. Patel	200
Experimental Study on Reinforced Aluminium Metal Matrix Composites with B₄C through Different Techniques S. Nallusamy, R.T. Chander and G.V. Punna Rao	214
Effect of Processing Parameters on Mechanical Properties of Al7175/Boron Carbide (B₄C) Composite Fabricated by Powder Metallurgy Techniques G. Manohar, K.M. Pandey and S.R. Maity	224
Validation of Archimedes Method and Acid Dissolution Test for Volume Fraction Determination of Aluminum Alloy Composites Reinforced with Ceramic Particles R. Saminathan, N. Mohammed Raffiq, K. Ganesh Babu, H. Hadidi, M. Tharwan, Y.A. Fageehi and A. Alnujaie	233
Fabrication of Metal Matrix Composites with Thermally Unstable Reinforcements by Spark Plasma Sintering Y. Watanabe, Y.M. Shrikrishna and H. Sato	241
Electromagnetic Methods for Production of Aluminium Metal Matrix Composites M. Milgrāvis, G. Kronkalns, R. Nikoluškins, T. Beinerts, M. Kalvāns, A. Bojarevičs and I.A. Perianu	247
Study on Mechanical Properties of AA6061/SiC/B₄C Hybrid Nano Metal Matrix Composites S. Das, M. Chandrasekaran and S. Samanta	256
Corrosion of Aluminum Metal Matrix Composites: A Review of the Effect of Manufacturing Processes, Processing Routes and Secondary Phases R.T. Loto and A. Adeleke	264
Fabrication of Carbon Nanotube/Aluminum Matrix Composites by Ball Milling and Cold Press Processing S. Kimura, J. Ueda and H. Tsukamoto	275
Effect of Particle Morphology on Thermal Properties of TiB₂ Particle Dispersed Pure Aluminum Composites G. Sasaki	284

Chapter 2: Titanium Matrix Composites

Microstructure Characterization of <i>In Situ</i> Ti-TiB Metal Matrix Composites Prepared by Powder Metallurgy Process	
H. Singh, M.D. Hayat, R. Das, X.G. Wang and P. Cao	291
Tensile Fracture of TiB Whisker Reinforced Ti Alloy Matrix Composites	
H. Kurita, K. Kondoh, J. Umeda and N. Yodoshi	297
Multi-Objective Optimisation of Laser Deposition of Metal Matrix Composites for Surface Coating Using Principal Component Analysis	
P.K. Farayibi	302
Microstructural Evolution of Metal Matrix Composites Formed by Laser Deposition of Ti-6Al-4V Wire and WC-W₂C Powder	
P.K. Farayibi	315

Chapter 3: Magnesium Matrix Composites

Evaluation of Fatigue Behavior of Silicon Carbide Particles Reinforced with Magnesium Alloy Metal Matrix Composites	
S.J. Huang, M. Subramani, A. Ali, D. Alemayehu, J.N. Aoh and P.C. Lin	329
Recent Studies on the Fabrication of Magnesium Based Metal Matrix Nano-Composites by Using Ultrasonic Stir Casting Technique - A Review	
D. Kumar and L. Thakur	335
A Review on Exploration of Magnesium Matrix Composites	
S. Jayasathyakawin, M. Ravichandran, V. Mohanavel, T. Sathish, S.D. Kumar, S. Rajkumar and R. Subbiah	341
A Review of Magnesium Based MMC Fabrication Techniques for Biomedical Applications	
P. Sonia, J.K. Jain and K.A. Mohammed	349

Chapter 4: High-Temperature Alloys Matrix Composites

Selective Laser Melting of Mixed EP648-Alumina Powder	
R.M. Baitimerov, A.B. Liberzon and V.I. Mitin	361
Alumina Reinforced EP648 Metal Matrix Composite Produced by Selective Laser Melting Powder Bed Fusion Additive Technology	
P.A. Lykov and L.V. Radionova	367
High Entropy Based Composites - An Overview	
T. Ram Prabhu, Y. Chodancar, M. Arivarasu, N. Arivazhagan and R.K. Mishra	373
Influence of Distinct Manufacturing Processes on the Microstructure of Ni-Based Metal Matrix Composites Submitted to Long Thermal Exposure	
G. Lemos, M.C. Fredel, F. Pyczak and U. Tetzlaff	379
Development and Properties of Cast TiAl Matrix <i>In Situ</i> Composites Reinforced with Carbide Particles	
J. Lapin, A. Klimová, M. Štamborská, K. Kamyshnykova and T. Pelachová	387
Mechanical Properties of Interface Layers in SiC/TiAl Composite	
K. Hashimoto and J. Jin	394

Chapter 5: Other Non-Ferrous Alloys Matrix Composites

Study of the Mechanical Properties of the Copper Matrix Composites (CMCs): A Review	
N. Poullose, P. Selvakumar, J.T. Philip, A. Ananthi and S. Kavitha	401
Processing of Alumina Reinforced Copper Metal Matrix Composite by Selective Laser Melting Technology	
R.M. Baitimerov and V.A. Bykov	424
Improvement of Mechanical Properties of Cu/Graphene Composite by <i>In Site</i> Reduction and Matrix Alloying with Titanium	
Y.Z. Li, Y. Zhao and X. Ran	430

Influence of Sic and Al₂O₃ Particulate Reinforcement on the Mechanical Properties of ZA27 Metal Matrix Composites	
B.N. Anjan and G.V.P. Kumar	436
Manufacture of Continuous Metal Matrix Composite Strip Reinforced by Particulate Materials from the Semisolid Processing	
A. de Pádua Lima Filho, B.K.S. Ueda, T.P. de Castro and R.A.N. de Oliveira	442
Development of Bronze Metal Matrix Composite for Automobile and Marine Applications	
R.U. Krishnan, J. Mohan, G. Alex, J.P. Arjun, K.U.D. Darshan, K.V. Shankar and A. Krishnan	450
High-Speed Laser Melt Injection of Tungsten Carbide in Highly Conductive Copper Alloys	
P. Warneke and T. Seefeld	456
Wear Resistance of Hard Particle Reinforced Copper Alloys Generated by Laser Melt Injection	
P. Warneke and T. Seefeld	462

Chapter 6: Graded Composites

Cladding of Stellite-6/WC Composites Coatings by Laser Metal Deposition	
T. Kunimine, R. Miyazaki, Y. Yamashita, Y. Funada, Y. Sato and M. Tsukamoto	473
Further Development of Process Maps for TRIP Matrix Composites during Powder Forging	
M. Kirschner, S. Guk, R. Kawalla and U. Prah	479
Influence of the Process Parameters on the Penetration Depth of the Reinforcing Phase during Composite Peening for the Production of Functionally Graded Metal Matrix Composites	
M. Seitz and K.A. Weidenmann	488
Empirical Model for Dry Sliding Wear Behaviour of Centrifugally Cast Functionally Graded Al/SiC_p Composite	
I.M. El-Galy, B.I. Bassiouny and M.H. Ahmed	494

Chapter 7: Surface, Thermal and Thermo-Mechanical Treatments of Metal Matrix Composites

Enhanced Corrosion Resistance of SiC_p/ 2009 Al by Cerium and Lanthanum Conversion Treatment	
I. Aziz and Q. Zhang	507
AlSi-SiC Composites for Automotive Brake Rotor	
F. Firouz, A. Daoud and M.A. El-Khair	512
Foaming and Compressive Properties of A359/SiC_p Metal Matrix Composites	
R.K. Nadella, J.R. Ginuga, S. Pati and A. Gokhale	520
A Study on Particle Weight Fraction and Extrusion on the Mechanical Properties and Microstructural Evaluation of Al-Cu/Fly Ash Composite	
G.N. Lokesh, G.P. Prasad, S. Raghavendra and K.P. Prashanth	527
Effect of Carbon Nanotubes Addition on the Formability of Al-CNT Composite	
M. Mansoor, M. Shahid and N. Ejaz	539
Stir Casting and Successive Rolling of Aluminium Alloy 2218 MMCs Reinforced by High-Entropy Alloy Particles	
M. Vijayakumar, M. Pradeep Rai, M. Muthukrishnan and N. Gnanakumar	548
Thermo-Mechanical Treatment of Titanium Based Layered Structures Fabricated by Blended Elemental Powder Metallurgy	
S.V. Prikhodko, P.E. Markovsky, D.G. Savvakina, O. Stasiuk and O.M. Ivasishin	557
Cold Sprayed Additive Manufacturing of SiC/Al Metal Matrix Composite: Synthesis, Microstructure, Heat Treatment and Tensile Properties	
L. Gyansah, N.H. Tariq, J.R. Tang, X. Qiu, J.Z. Gao, J.Q. Wang and T.Y. Xiong	564

Chapter 8: Machining and Joining of Metal Matrix Composites

Experimental Investigation during Micro-Milling of Hybrid Al6063 MMC Reinforced with SiC and ZrO₂ P. Tripathy and K.P. Maity	581
Investigation of Flux-Less Soldering of Metal Matrix Composite and Ceramics by Use of Zn Solder R. Koleňák and I. Kostolný	590
Study of Machining Parameter Optimization in Drilling of Magnesium Based Hybrid Composites Reinforced with SiC/CNT J.S.S. Babu, M. Heo and C.G. Kang	596
Reinforcement and Cutting Tools Interaction during MMC Machining - A Review M. Chaudhari and M.S. Kumar	601
Study on Surface Roughness in Minimum Quantity Lubrication Turning of Al-6082/SiC Metal Matrix Composites C.J. Vishwas, M.N. Gajanan, B. Sachin, R. Abhinaba, N.P. Puneet, B.N. Anjan and N.K. Vinayak	609
Energy Consumption Prediction Model of SiCp/Al Composite in Grinding Based on PSO-BP Neural Network P. Gu, C.M. Zhu, Y.Y. Wu and A. Mura	616
Studies on Dissimilar Friction Stir Welded Al-4Cu-TiB₂ <i>In Situ</i> Composites with Base Alloy S. Haribabu, M. Ashfaq, K. Sivaprasad, S. Muthukumaran and R. Narayanasamy	622
Investigation on Machining of Hybrid Metal Matrix Composite A.K. Bodukuri, K. Eswaraiiah and V. Pradeep	633
WEDM Parametric Study on Machining Responses of AA-6082/MoS₂/Al₂O₃ HMMCs C.L. Srinivas, N.B. Kumar, N. Brahmaiah, P.S. Kumar, P. Abhinash and D.V. Praveen	639
WEDM Machining Performance of Al Based Metal Matrix Composites Reinforced with Rice Husk Ash Z. Seikh, S. Kunar, R. Haque, S. Haidar and M. Sekh	647