International Conference on Recent Advances in Materials and Manufacturing Technologies (IMMT 2017)

IOP Conference Series: Materials Science and Engineering Volume 346

Dubai, United Arab Emirates 28 - 29 November 2017

Editors:

R. Karthikeyan Vincent Shantha Kumar

Vishal Naranje Shashank Khurana

ISBN: 978-1-5108-6263-0

ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by the Institute of Physics All rights reserved. The material featured in this book is subject to IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact the Institute of Physics at the address below.

Institute of Physics Dirac House, Temple Back Bristol BS1 6BE UK

Phone: 44 1 17 929 7481 Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

Table of contents

Volume 346

International Conference on Recent Advances in Materials & Manufacturing Technologies

28-29 November 2017, Dubai, UAE

Accepted papers received: 6 April 2018

Published online: 1 May 2018

Preface

<u>International Conference on Recent Advances in Materials & Manufacturing Technologies</u>

Peer review statement

Papers

Materials & Testing

Effect of graphenenano-platelets on the mechanical properties of Mg/3wt%Al alloy-nanocomposite

Pravir Kumar, MilliSuchita Kujur, Ashis Mallick, Khin Sandar Tun and Manoj Gupta.....1

On the role of magnetic field intensity for better micro-structural characterization during Barkhausen Noise analysis

Mohd Zaheer Khan Yusufzai and M. Vashista.....9

Effect of magnetizing field strength and magnetizing frequency on hysteresis loop shape and its characteristics

M. Vashista and Mohd. Zaheer Khan Yusufzai....16

A study on mechanical properties of PBT nano-composites reinforced with microwave functionalized MWCNTs

Revati Deshpande, Garima Naik, Swamini Chopra, Kavita A. Deshmukh, Abhay D. Deshmukh and D. R. Peshwe.....23

<u>Functionalization and Melt-compounding of MWCNTs in PA-6 for Tribological</u> Applications

Swamini Chopra, Kavita A. Deshmukh, Abhay D. Deshmukh and D. R. Peshwe.....31

Effect of Deep Cryogenic treatment on AISI A8 Tool steel & Development of Wear Mechanism maps using Fuzzy Clustering

Nandakumar Pillai and Dr. R Karthikeyan....39

Wear behavior of carbide tool coated with Yttria-stabilized zirconia nano particles.

Pavandatta M Jadhav and Narala Suresh Kumar Reddy.....48

<u>Creep life prediction of super heater coils used in coal based thermal power plants</u> subjected to fly ash erosion and oxide scale formation

P Srinivasan and Shashank Kushwaha.....58

Biocorrosion Evaluation on a Zr-Cu-Ag-Ti Metallic Glass

Shresh Kumar, Rebin Anwar, Wookha Ryu, E. S. Park and S. Vincent.....70

<u>Corrosion Characterization in Nickel Plated 110 ksi Low Alloy Steel and Incoloy 925:</u> <u>An Experimental Case Study</u>

Kiran Thomas, S. Vincent, Dipika Barbadikar, Shresh Kumar, Rebin Anwar and Nevil Fernandes.....76

Review of research and developments in self healing composite materials

Sahith Reddy Madara, N. S Sarath Raj and Dr. Chithirai Pon Selvan.....82

<u>Influence of silica nanospheres on corrosion behavior of magnesium matrix syntactic foam</u>

W Qureshi, S Kannan, S Vincent, N N Eddine, A Muhammed, M Gupta, R. Karthikeyan and V Badari.....98

<u>Evaluation of Mechanical Properties of MWCNT / Nanoclay Reinforced Aluminium alloy Metal Matrix Composite</u>

P S Samuel Ratna Kumar, D S Robinson Smart and S John Alexis.....105

Hybrid Composite Material and Solid Particle Erosion Studies

D Chellaganesh, M Adam Khan, A Mohamed Ashif, T Ragul Selvan, S Nachiappan and J T Winowlin Jappes.....112

Friction and wear study of NR/SBR blends with Si₃N₄Filler

A GaneshKumar, G Balaganesan and M S Sivakumar.....118

Repair of through thickness corrosion/leaking defects in corroded pipelines using Fiber Reinforced Polymer overwrap

P Nitheesh Kumar, Vishwas Chandra Khan, G Balaganesan, A K Pradhan and M S Siyakumar.....129

<u>Indentation Creep Behavior of Nugget Zone of Friction Stir Welded 2014 Aluminum</u> Alloy

Jayashree Das, P. S. Robi and M. Ravi Sankar....138

Experimental and numerical investigation of strain rate effect on low cycle fatigue behaviour of AA 5754 alloy

P Kumar and A Singh.....145

Characterization of Austempered Ferritic Ductile Iron

Vinayak S Dakre, D R Peshwe, S U Pathak and A A Likhite.....153

Hari Krishan Yadav, A R Ballal, M M Thawre and V.D. Vijayanand.....163

Tribological performance of Zinc soft metal coatings in solid lubrication

Srinivasa Prakash Regalla, V Krishnan Anirudh and Suresh Kumar Reddy Narala.....171

Effect of anisotropy on mechanical properties of Ti-6Al-4V in superplastic region

MA Wahed, AK Gupta, SK Singh and N Kotkunde.....184

Material Selection for Microchannel Heatsink: Conjugate Heat Transfer Simulation

A. Uday Kumar, Arshad Javed and Satish K. Dubey.....190

A study on corrosion resistance of dissimilar welds between Monel 400 and 316L austenitic stainless steel

Cherish Mani, R Karthikeyan and S Vincent....197

Study of fracture toughness and bend test morphologies of HVOF sprayed Cr₃C₂-25% NiCr coating after heat treatment

Sharad Shrivastava and Rohit Upadhyaya.....205

Moisture Absorption Behaviour of Biopolymer Polycapralactone (PCL) / Organo Modified Montmorillonite Clay (OMMT) biocomposite films

Neetu Malik, Sharad Shrivastava and Subrata Bandhu Ghosh....213

Optimization of macronutrient kinetics for biomass production in Nostoc calcicola

Subramanian Seshadri C Aiyer, A Akshai, B G Prakash Kumar and S Ramachandran.....219

Mechanical Behavior of Polymer Nano Bio Composite for Orthopedic Implants

Dr. K. Marimuthu and Sankar Rajan....227

| Investigation on Mechanical | and Fatigue behaviour | of Aluminium | Based SiC/ZrO2 |
|-----------------------------|-----------------------|--------------|----------------|
| Particle Reinforced MMC | | | |

S. Ramesh, N. Govindaraju and C.P. Suryanarayan....237

Performance analysis of automobile radiator using carboxyl graphene nanofluids

Babu Rao Ponangi, S Sumanth, V Krishna, T R Seetharam and K N Seetharamu.....245

Heat transfer analysis of radiator using graphene oxide nanofluids

Babu Rao Ponangi, S Sumanth, V Krishna, T R Seetharam and K N Seetharamu.....253

Experimental Studies on role of pH, potential and concentration of buffer solution for chemical bath deposition technique

B L Suresha, H S Sumantha, K Mohammed Salman, N G Pramod and J Abhiram.....261

Effect of Dynamic Pressure on the Performance of Thermoacoustic Refrigerator with Aluminium (Al) Resonator

Bheemsha Arya, B Ramesh Nayak and N V Shivakumara.....266

Sliding wear and corrosion behaviour of alloyed austempered ductile iron subjected to novel two step austempering treatment

D. Sethuram, Shravani Srisailam and Babu Rao Ponangi.....274

Manufacturing

A study on the effect of tool electrode thickness on MRR, and TWR in electrical discharge turning process

Vikas Gohil and YM Puri.....282

<u>Prediction of surface roughness in turning of Ti-6Al-4V using cutting parameters, forces</u> and tool vibration

Neelesh Kumar Sahu, Atul B. Andhare, Sandip Andhale and Roja Raju Abraham....290

<u>Prediction Analysis of Weld-Bead and Heat Affected Zone in TIG welding using</u> Artificial Neural Networks

Shamith L Saldanha, V Kalaichelvi and R Karthikeyan.....302

Application of Fuzzy TOPSIS for evaluating machining techniques using sustainability metrics

Abhijeet K Digalwar.....310

An Experimental Study on the Edgewise Compressive Failure of Paper Honeycomb Sandwich Panels with Respect to Various Aspect Ratios

W A Samad, A A Warsame and A Khan....317

Influence of tool geometry and processing parameters on welding defects and mechanical properties for friction stir welding of 6061 Aluminium alloy

A Daneji, M Ali and S Pervaiz.....323

Tool life and surface integrity aspects when drilling nickel alloy

S Kannan, S Pervaiz, S. Vincent and R. Karthikeyan....331

Effect of young's modulus on springback for low, medium and high carbon steels during cold drawing of seamless tubes

D B Karanjule, S S Bhamare and T H Rao.....339

Machinability of nickel based alloys using electrical discharge machining process

M Adam Khan, A K Gokul, M.P Bharani Dharan, R.V.S Jeevakarthikeyan, M Uthayakumar, S Thirumalai Kumaran and M Duraiselvam....351

Tool Condition Monitoring in Micro-End Milling using wavelets

N K Dubey, A Roushan, U S Rao, K Sandeep and K Patra.....356

| Tool wear compensation | n scheme i | tor D | TM |
|------------------------|------------|-------|----|
|------------------------|------------|-------|----|

K Sandeep, U S Rao and R Balasubramaniam.....364

Mechanical Alloying of W-Mo-V-Cr-Ta High Entropy Alloys

Sujit Das and P S Robi.....370

<u>Development of a Novel Ni-Fe-Cr-B-Si Interlayer Material for Transient Liquid Phase</u> Bonding of Inconel 718

U K Tarai, P S Robi and Sukhomay Pal....377

Weld defect identification in friction stir welding using power spectral density

Bipul Das, Sukhomay Pal and Swarup Bag.....385

Development of 2024 AA-Yttrium composites by Spark Plasma Sintering

CH S Vidyasagar and D B Karunakar.....391

Microscale heat transfer in fusion welding of glass by ultra-short pulse laser using dual phase lag effects

Swarup Bag.....399

Experimental investigation on in-situ microwave casting of copper

Radha Raman Mishra and Apurbba Kumar Sharma.....410

Investigation of tool wear and surface roughness on machining of titanium alloy with MT-CVD cutting tool

Kalipada Maity and Swastik Pradhan....416

An Overview on Impact Behaviour and Energy Absorption of Collapsible Metallic and Non-Metallic Energy Absorbers used in Automotive Applications

R B Shinde and K D Mali.....426

Improvisation of mechanical and electrical properties of Cu by reinforcing MWCNT using modified electro-co-deposition process

Sachin U Belgamwar and N N Sharma.....437

Analysis of Agility Performance of Supply Chain: A Case Study on Indian Automotive Manufacturer

S Routroy, S Sharma and A Bhardwaj.....446

On surface integrity of Al 2014 alloy finished by Ultrasonic Assisted Abrasive Flow Machining

Gudipadu Venkatesh, Divyank Sood and Apurbba Kumar Sharma.....455

Exploring the influence of constitutive models and associated parameters for the orthogonal machining of Ti6Al4V

S Pervaiz, S Anwar, S Kannan and A Almarfadi.....462

Minimization of the hole overcut and cylindricity errors during rotary ultrasonic drilling of Ti-6Al-4V

M Nasr, S Anwar, A El-Tamimi and S Pervaiz.....470

Effect of rotation speed and welding speed on Friction Stir Welding of AA1100 Aluminium alloy

P Raja, S Bojanampati, R Karthikeyan and R Ganithi.....481

Comparative study of manufacturing condyle implant using rapid prototyping and CNC machining

S Bojanampati, R Karthikeyan, MD Islam and S Venugopal.....488

Experimental Investigation – Magnetic Assisted Electro Discharge Machining

Chirra Kesava Reddy, M. Manzoor Hussain, S. Satyanarayana and M.V.S. Murali Krishna....498

| | Mathematical | modeling | and hvdi | odvnamics | of Electrochemical | deburring process |
|--|--------------|----------|----------|-----------|--------------------|-------------------|
|--|--------------|----------|----------|-----------|--------------------|-------------------|

Satisha Prabhu and Dr K Abhishek Kumar.....506

<u>Investigations of Effect of Rotary EDM Electrode on Machining Performance of Al6061</u> Alloy

D S Robinson Smart, Joses Jenish Smart, C Periasamy and P S Samuel Ratna Kumar.....514

Effects Of Welding On The Fatigue Behaviour Of Commercial Aluminum AA-1100 Joints

M. Uthayakumar, V. Balasubramanian, Ahmad Majdi Abdul Rani and Branislav Hadzima.....520

Modeling & Simulation

Prediction of blood pressure and blood flow in stenosed renal arteries using CFD

Pooja Jhunjhunwala, P M Padole, S B Thombre and Atul Sane....532

Prediction of ttt curves of cold working tool steels using support vector machine model

Nandakumar Pillai and Dr. R Karthikeyan.....544

Analysis of materials used for Greenhouse roof covering - structure using CFD

M C Subin, Jason Savio Lourence, Ram Karthikeyan and C Periasamy.....553

Optimization of BI test parameters to investigate mechanical properties of Grade 92 steel

Dipika R Barbadikar, S. Vincent, Atul R Ballal, Dilip R Peshwe and M D Mathew.....567

<u>Intra-Laminar Fracture Toughness of Glass Fiber Reinforced Polymer By Using Theory, Experimentation and FEA</u>

Pathan Firojkhan, Kshitijit Tanpure, Ajinkya Dawale and Shital Patil.....576

| Analysis of multi lobe | journal | bearings | with | surface | roughness | using | finite | differen | ıce |
|------------------------|---------|----------|------|---------|-----------|-------|--------|----------|-----|
| method | - | _ | | | _ | | | | |

K PhaniRaja Kumar, SUdaya Bhaskar and M Manzoor Hussain.....585

Development of sacrificial support fixture using deflection analysis

Ashwini M. Ramteke and Kishor M Ashtankar.....594

Modeling and Analysis of CNC Milling Process Parameters on Al3030 based Composite

Anand Gupta, P K Soni and C M Krishna.....610

Study of Surface Roughness and Cutting force in machining for 6068 Aluminium alloy

D. Purushothaman, Krishna Kaushik Yanamundra, Gokul Krishnan and C. Perisamy.....618

Finite element simulation and Experimental verification of Incremental Sheet metal Forming

Krishna Kaushik Yanamundra, Dr. R Karthikeyan and Dr Vishal Naranje.....630

Effect of Entropy Generation on Wear Mechanics and System Reliability

Akshay Gidwani, Siddanth James, Sagar Jagtap, Ram Karthikeyan and S. Vincent.....642

Behaviour of tunnel lining material in road tunnel fire

M Tomar, S Khurana and R Singh....657

Development of an Empirical Model for Optimization of Machining Parameters to Minimize Power Consumption

Girish Kant Garg, Suman Garg and K.S Sangwan.....666

<u>Comparison of Piezo-material based Energy Transduction Systems for Artificial</u> Nanoswimmer

S Nain, J S Rathore and N N Sharma.....674

<u>AUTOMATION OF UNDERGROUND CABLE LAYING EQUIPMENT USING PLC</u> AND HMI

Kesar Mal Kothari, Vishweshwar Samba, Kinza Tania, Dr R Udayakumar and Dr Ram Karthikeyan.....682

<u>Influence of nanoclay on interlaminar shear strength and fracture toughness of glass fiber</u> reinforced nanocomposites

M S Senthil Kumar, M Chithirai Pon Selvan, P S Sampath, K Raja and K Balasundaram.....694

<u>Comparative Investigation and Operational Performance Characteristics of a Wick</u> <u>Assisted and Axially Square Grooved Heat Pipe</u>

Dr. Rudra Naik, Dr. K Rama Narasihma and Atmanand Anikivi.....706

Study on the repeatability of manufacturing nano-silica (SiO₂) reinforced composite laminates

L Prince Jeya Lal, S Ramesh and Elango Natarajan.....713

<u>CFD</u> analysis of heat transfer performance of graphene based hybrid nanofluid in radiators

Bharath R Bharadwaj, K Sanketh Mogeraya, D M Manjunath, Babu Rao Ponangi, K S Rajendra Prasad and V Krishna.....721

<u>Application of Artificial Neural Network and Response Surface Methodology in Modeling of Surface Roughness in WS₂ Solid Lubricant Assisted MQL Turning of Inconel 718</u>

Uma Maheshwera Reddy Paturi, Harish Devarasetti, David Abimbola Fadare and Suresh Kumar Reddy Narala.....728

<u>Prediction Of Tensile And Shear Strength Of Friction Surfaced Tool Steel Deposit By Using Artificial Neural Networks</u>

M. Manzoor Hussain, V. Pitchi Raju, J. Kandasamy and D. Govardhan.....739