2019 X-ACADEMY JEJU ISLAND SOUTH KOREA CONFERENCE

2019 2nd International Conference on Metal Material Processes and Manufacturing (ICMMPM2019)

Jeju Island, South Korea

July 30-31, 2019

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Materials Science & Engineering

Simple Version of the Schedule

Programme detail Tuesday, July 30, 2019	
Conference Schedule	
Conference Venue	Jeju Hana Hotel, Jeju Island, South Korea
Date & Time	Tuesday, July 30, 2019 14:00-17:00
Conference Schedule	Sign in

Programme detail Wednesday,July 31, 2019		
9:00-11:50	Plenary Session & Keynote Session	
	9:00-9:30	Plenary speech 1: Prof. Dong-Won Jung ***Topic:*** *Experimental and numerical investigation of cold roll forming process*
	9:30-10:00	Keynote speech 1: Ass. Prof. Ewa Kowalska ***Topic:*** *Vis-responsive photocatalysts composed of titania and noble metals for environmental purification*
10:00-10:20	Tea Break & Photo	
10:20-10:50	Keynote speech 2: Ass. Prof. Kwok, Chi Tat ***Topic:*** *Recent Research Status and Prospect of Friction Surfacing of Stainless Steels*	
10:50-11:20	Keynote speech 3: Prof. Takahiro OHASHi ***Topic:*** *Alleviation of Machine Difference in Press Working with a Multi-Point Die Support System*	
11:20-11:50	Keynote speech 4: Prof. Wen-Tsai Sung ***Topic:*** *Innovative AIoT technology development and application*	
11:50-13:00	Lunch Break	
13:00-15:00	Session 1	
15:00-15:30	Tea Break & Poster Session	
15:30-18:00	Session 2	

Committees

Conference Chairs

Prof. Dong-Won Jung, Jeju National University, South Korea

Technical Committee

Professor Marcin Barburski, Lodz University of Technology, Poland

Dr. Roya Darabi, Jeju National University, South Korea

Dr. Wu-Le Zhu, Kyoto University, Japan

Professor Hwang Yi, Ajou University, South Korea

Dr. Oscar Hui, University of East Anglia, UK

Professor Ing. Abdullah Al-Janabi, Sultan Qaboos University, German

Professor Fatma Yalcinkaya, Technical University of Liberec, Turkey

Professor Huan-Liang Tsai, Da-Yeh University, Taiwan

Dr. Kim Si jin, Samsung Display Company, South Korea

Dr. BROURI Adil, Moulay Ismail University, Morocco

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Professor DEBILI MOHAMED YACINE, Badji-Mokhtar University, Algeria

Prof. Mohamed Abdel Moneim Deyab, Egyptian Petroleum Research Institute (EPRI), Cairo, Egypt

Professor Ayssar Nahlé, University of Sharjah, Sharjah

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Dr. RAJIV KUMAR, Goswami Ganesh Dutt Sanatan Dharam College, India

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Prof. Farid ABED-MERAIM, Laboratory of Microstructure Analysis and Mechanics of Materials, French

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Dr. Yasin Polat, Nevşehir Hacı Bektaş Veli University, Turkey

Assoc. Prof. Achanai Buasri, Silpakorn University, Thailand

Dr. Antonio Riveiro Rodríguez, University of Vigo, Spain

Prof. Ji Shijun, Jilin University, China

Dr. Brahim Safi, University M'hamed Bougara of Boumerdes, Algeria

Prof. Arnulfo Luévanos-Rojas, Autonomous University of Coahuila, México

Dr. Yanjun Li, Florida Atlantic University, USA

Assoc. Prof. Dr. Soumya Mukherjee, Amity University, India

Dr. Beddiaf ZAIDI, University of Batna 1, Algeria

Prof. Vineet Jain, Amity University Haryana, Gurgaon

Associate Prof. Jin-Young Kim, Ulsan National Institute of Science and Technology, South Korea

Assistant Prof. Ankit Gupta, School of Engineering, Shiv Nadar University, Gr. Noida, India

Ph.D. Grzegorz Woroniak, Bialystok University of Technology, Poland

Assistant Prof. MANJUNATH SHETTAR, Manipal Institute of Technology, India

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Dr. Aruri Devaraju, National Institute of Technology Warangal, India

Prof. Bappa Acherjee, Department of Production Engineering Birla Institute of Technology, India

Prof. Walid Tawfik Younes Mohamed, Cairo University, Egypt

Dr. R.Viswanathan, Swami Vivekananda Institute of Technology, Secunderabad, India

Dr. Samson Jerold Samuel Chelladurai, Mechanical Engineering, Sri Krishna College of Engineering and Technology, India

Dr. Anjanapura V. Raghu, JAIN University, India

Associate Prof. Mamoun FELLAH, Mechanical Engineering department
Abbes LAGHOUR, Khenchela University, Algeria

Associate Prof. Siti Ujila Masuri, Universiti Putra Malaysia, Malaysia

Dr. Iman Bagherpour, National Iranian Gas Company, Iran

Dr. GHULAM HASNAIN TARIQ, Khawaja Fareed University of Engineering & Information Technology, Pakistan.

Venue

Conference venue: Jeju Hana Hotel, Jeju Island, South Korea
Add: 135, Jungmun Gwangwangjiroro, Seogwipo-city, Jeju-do, 697-808, Republic of Korea
Web: http://www.hotelhana.co.kr
Tel: (064)738-7001~1
Fax: (064)738-7015

Accommodation
1. Please book your own accommodation in advance, you can book in Jeju Hana Hotel.
2. Also you can arrange your accommodation in other nearby hotels according to your needs.

Note:

1. All the participants are strongly advised to arrive before 8:50, July 31, 2019.
2. Certificate of Participation can be collected at the registration counter.
3. Please copy PPT files of your presentation to the secretary when registration.
4. The organizer doesn't provide accommodation, and we suggest you make an early reservation.
5. If you want to deliver oral presentation but your paper is not in the session list, please contact us by Email: cfp@icmmpm.org (for ICMMPM2019)

Instruction about Oral Presentation

Devices Provided by the Conference Organizer:

Laptops
Projectors & Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF files
Duration of each Presentation:
Regular Oral Session: about 8-10 Minutes of Presentation and 5 Minutes of Q&A

Plenary Speech (9:00-9:30)

Plenary Speech-1 09:00-9:30

Prof. Dong-Won Jung
Jeju national University, South Korea

Title: "Experimental and numerical investigation of cold roll forming process"

Professor Dong-Won Jung works in School of Mechancial Engineering. He has rich experience in metal forming field. He is a professional reviewer of plenty Journals, such as KSME (Korean Society of Mechanical Engineers), KSPE (Korean Society for Precision Engineering), KSTP(Korean Society for Technology of Plasticity), KSAE(Korean Society for Automobile Engineers), Journal of Ocean Engineering and Technology, Journal of Korea Society for Power System Engineering, the Korean Journal of CAE, etc. He also has lot of publications and academic conference experiences.

Keynote Speech (9:30-11:50)

Keynote Speech 1-9:30-10:00

Associate prof. Ewa Kowalska
Hokkaido University, Japan

Title: "Vis-responsive photocatalysts composed of titania and noble metals for environmental purification"

Ewa Kowalska is an associate professor and a leader of Research Cluster for Plasmonic Photocatalysis in Institute for Catalysis, Hokkaido University. She received her PhD degree in chemical technology from Gdansk University of Technology, Poland in 2004. After completing JSPS fellowship (2005-2007), GCOE postdoctoral fellowships (2007-2009) in Japan, and Marie Curie fellowships in France (2002-2003) and in Germany (2009-12), she joined Institute for Catalysis as an associate professor in 2012.

10:00-10:20	Photo & Coffee Break

Keynote Speech 2-10:20-10:50

Associate Prof. Kwok, Chi Tat
University of Macau, China

Title: "Recent Research Status and Prospect of Friction Surfacing of Stainless Steels"

Prof. Chi Tat Kwok received a Ph.D. degree in Applied Physics from the Hong Kong Polytechnic University and works as an Associate Professor and Department Head of Electromechanical Engineering in University of Macau. He has background in corrosion and surface engineering, and his research interests include corrosion, cavitation erosion and wear of engineering materials, laser materials processing, friction stir processing, electrophoretic deposition of hydroxyapatite coatings and nanostructured materials. Prof. Kwok has published 110 book chapters, journal and conference papers related to laser processing, friction stir processing, corrosion, cavitation erosion and wear of engineering materials and coatings (h-index = 28, Scopus). He was the Editor of a monograph entitled 'Laser Surface Modification of Alloys for Erosion and Corrosion Resistance', published by Woodhead Publishing in 2012. Moreover, he is invited to be the editorial member of 'Surface and Coating Technology (SCI-E journal) (2013-present) and the Guest Editor of the SCI Journal 'Coatings' - Special Issue 'Recent Advances in Friction Stir Processed Coatings' (2017-present), and the Member of American Society for Testing and Materials Task Group on Revision of Method G32 - Standard Test Method for Cavitation Erosion Using Vibratory Apparatus (2008-2010).

Keynote Speech-3 10:50-11:20

Prof. Takahiro OHASHi

Kokushikan University, Japan

Title: "Alleviation of Machine Difference in Press Working with a Multi-Point Die Support System "

Prof. Takahiro Ohashi is the head of Mechanical Engineering Department, Graduate School of Science and Engineering, Kokushikan University.Formerly, He directed 3 research teams, including the Metal Forming Research Team, of National Institute of Advanced Industrial Science and Technology (AIST), Trading and Industry (METI) of Japan. He is one of representative delegates of Japan Society for Technology of Plasticity, and the board of trustees of Aluminum Forging Association in Japan. He has been engaged in the research and development of new metalforming processes utilizing die and mold.

Keynote Speech-4 11:20-11:50

Prof. Wen-Tsai Sung

National Chin-Yi University of Technology, Taiwan, China

Title: "Innovative AIoT technology development and applicatio"

Prof. Wen-Tsai Sung is working with the Department of Electrical Engineering, National Chin-Yi University of Technology as a professor and Vice-Dean of Academic Affairs. He received a PhD and MS degree from the Department of Electrical Engineering, National Central University, Taiwan in 2007 and 2000. He has won the 2009 JMBE Best Annual Excellent Paper Award and the dragon thesis award that sponsor is Acer Foundation. His research interests include Wireless Sensors Network, Data Fusion, System Biology, System on Chip, Computer-Aided Design for Learning, Bioinformatics, and Biomedical Engineering. He has published a number of international journal and conferences article related to these areas. Currently, he is the chief of Wireless Sensors Networks

Laboratory. At present, he serves as the Editor-in-Chief in three international journals: International Journal of Communications (IJC), Communications in Information Science and Management Engineering (CISME) and Journal of Vibration Analysis, Measurement, and Control (JVAMC), he also serves as the other international journals in Associate-Editor and Guest Editor (IET Systems Biology).

11:50-13:00	Lunch

Session1 (13:00-15:00)

1-Paper ID: 1

Title: Size-controlled nanoparticles of noble metals deposited on titania for enhancement of photocatalytic performance

Authors: Kunlei Wang, Zhishun Wei, Maya Endo, Christophe Colbeau-Justin, Bunsho Ohtani, Hynd Remita, Ewa Kowalska

Department: Hokkaido University, Hubei University of Technology, Paris-Sud University

Abstract: Noble metals nanoparticles (NMNPs) have been used for the enhancement of the photocatalytic activity of wide bandgap semiconductors (e.g., titania) for more than forty years (since A. J. Bard), because of hindering of charge carriers' recombination (as an electron sink). Moreover, their application as sensitizers (to activate semiconductors toward visible light (vis)) has recently been investigated, due to ability of vis absorption through localized surface plasmon resonance (LSPR). It should be pointed out that the properties of both titania and NMNPs strongly influence the resultant properties of NMNP-modified titania, and thus the photocatalytic activity. Therefore, in the present study, the size-controlled NMNPs have been prepared by two methods, i.e., photodeposition and radiolysis. Moreover, the photodeposition conditions (light intensity, anaerobic/aerobic and hole scavenger) have been varied to obtain photocatalysts possessing different properties of NMNPs, e.g., uniformed/aggregated, different sizes and morphology (spherical, rod-like). Indeed, the photocatalysts, prepared by different methods (and various conditions), have significantly differed from each other, and thus in resultant photocatalytic activities, which will be discussed during the presentation.

2-Paper ID: 12

Title: Hig-temperature oxidation-resistant nanocoatings electrodeposited by application of nanoparticles and in combination with electrophoretic deposition

Authors: X. Peng

Department: Nanchang Hangkong University, Laboratory for Corrosion and Protection, Institute of Metal Research, Chinese Academy of Sciences, Shenyang, China

Abstract: Because of limitations of the content of Cr and/or Al, high temperature metallic structural materials normally have no capability of thermally growing a protective scale of Cr_2O_3 or Al_2O_3 which has the advantages of slow thickening rate, good compactness and high thermodynamic stability. Hence, adding Cr_2O_3 - and Al_2O_3 -forming coatings are always a preferred choice to protect these metallic materials from unacceptable oxidation at high temperatures. Development of the oxidation-resistant coatings by various physical and chemical methods have been widely reported.

3-Paper ID: PM206

Title: Dry Process for Fabricating Low Cost and High Performance Electrode for Energy Storage Devices

Authors: Jim P. Zheng, Qiang Wu

Department: Department of Electrical and Computer Engineering, Florida A&M University and Florida State University

Abstract: We report a roll-to-roll dry processing for making low cost and high performance electrodes for lithium ion batteries (LIBs) and lithium ion capacitors (LICs). Currently, the electrodes for LIBs and LICs are made with a coating or slurry casting procedure (wet method). The dry electrode fabrication is a three-step process including: step 1 of uniformly mixing electrode materials powders comprising an active material, a carbonaceous conductor and the soft polymer binder; and step 2 of forming a free-standing, continuous electrode film by pressing the uniformly mixed powders together through the gap between two rolls of a roll-mill and step 3 of roll-to-roll laminating the electrode film onto a substrate such as a current collector.

4-Paper ID: 8

Title: A finite element model for temperature prediction in laser-assisted milling of AerMet100 steel

Authors: H.H. Zeng, R. Yan, W. Wang, P.L. Du, T.T. Hu, F.Y. Peng

Department: Huazhong University of Science and Technology, Wuhan, China

Abstract: Laser-assisted milling (LAM) represents an innovative process to enhance productivity in comparison with conventional milling. The workpiece temperature in LAM not only affects the cutting performance of materials, but also the machined surface quality of the part. This paper presents a 3D transient finite element (FE) model for workpiece temperature prediction in LAM. A moving Gaussian laser heat source model is implemented as a user-defined subroutine and linked to ABAQUS. The thermal model is validated by machining AerMet100 steel under different process parameters (laser power, spindle speed and feed per tooth). Good agreement between predicted and measured workpiece temperatures indicates that the FE model is feasible. In addition, the effects of laser spot size and incident angle on workpiece temperature are analyzed based on the proposed model. This work can be further applied to optimize process parameters for controlling the machined surface quality in LAM.

5-Paper ID: 53

Title: Thin platinum films topology formation on ceramic membranes

Authors: Nikolay Samotaev, Konstantin Oblov, Maya Etrekova, Anastasia Ivanova, Denis Veselov, Anastasiya Gorshkova

Department: National Research Nuclear University MEPhI, Moscow

Abstract: This article presents the technological aspects of experiments on the stable topological patterns formation from thin films of platinum on ceramic membranes. Platinum thin films were deposited by magnetron sputtering on a clean or pre-activated laser ceramics surface. After the deposition of platinum films, the method of various short-term laser irradiation was attempted to form a topological pattern. The results are discussed.

6-Paper ID: 55

Title: Friction Stir Forming of Aluminum Alloy Gear-Racks with Semi-Closed Dies

Authors: Takahiro Ohashi, Hamed Mofidi Tabatabaei, Tetta Ikeya, Tadashi Nishihara

Department: Kokushikan University, Japan

Abstract: This paper reports friction-stir forming (FSF) of gear-racks of JIS A5083 aluminum alloy with semi-closed dies. FSF is a modified friction-stir process suggested by Nishihara in 2002. The process generates frictional heat and internal forces, enabling massive deformation of the material. It has been successfully utilized for mechanical joining and microforming, but seems to offer an opportunity for net-shape forming of

bulk products as well. We put a material in a semi-closed gear-rack die and conducted friction stirring on its top surface. The material deformed and filled the cavity of the die due to high pressure and heat caused by friction stirring. This study investigates the forming conditions and the corresponding results, including the material fill ratio in the tooth. We also investigated the difference between this method and open-type FSF that had been conducted with an open-die structure.

7-Paper ID: 20

Title: Progress in the application of rare light metal beryllium

Authors: Lifang Zheng, Xiaogang Wang, Lina Yue, Yajie Xie, Baopeng Wu, Jingming Zhong

Department: University of Science and Technology Beijing, North China Institute of Science and Technology, Northwest Rare Metal Materials Research Institute

Abstract: As a special functional and structural material, the rare metal beryllium has been widely applied in many key areas due to its excellent nuclear properties, optical properties and physical properties such as low density, high specific stiffness, high specific strength, and excellent thermal properties. This article systematically reviews application of beryllium in strategic nuclear energy, high-energy physics, inertial navigation systems, aircraft structural components, optical systems and commercial fields. The paper also examines how beryllium promoted technological advances and improved the facilities performance in its applications fields. Beryllium plays an important role in the development of nuclear technology, defense, and aerospace, which make beryllium become a strategic and critical engineering material. The paper provides a reference for scientists and technicians to employ beryllium in more fields.

8-Paper ID: 10

Title: Electrically Conductive Hydrogels – Polyaniline/Polyacrylamide and Graphene /Polyacrylamide

Authors: Lee Xiau Yeen, Fan Hwee Wen, Koh Hui Jing

Department: Tunku Abdul Rahman University College, Kuala Lumpur

Abstract: Two types of electrically conductive hydrogels were prepared using polyaniline (PANI), graphene and polyacrylamide (PAA). PANI/PAA hydrogels were prepared using interfacial polymerization method and Graphene/PAA hydrogels were prepared using free radical polymerization method. Few characterization tests were carried out to investigate the properties of conductive hydrogel such as FT-IR, electrical conductivity tests, swelling tests and compression tests. Results obtained were compared with non-conductive PAA hydrogels. FT-IR indicated synthesis of both conductive hydrogels were succeeded. The highest electrical conductivity obtained was PANI/PAA (0.24 M) hydrogel, with a conductivity of 2.27 x 10-4 S cm-1. PANI/PAA hydrogels had a decrease in swelling ratio and an increase in Young's modulus compared to PAA hydrogels. Meanwhile, Graphene/PAA hydrogel showed a totally different result. Swelling ratio of Graphene/PAA hydrogels was increased but the Young's modulus was decreased as compared to PAA hydrogels.

9-Paper ID: 24

Title: The Research of Processing Methods of Thin-walled Waffle Constructions Taking Into Account Technological Deformations

Authors: R V Zuev, A D Zhargalova

Department: Bauman Moscow State Technical University, Moscow

Abstract: Technologists often notice deformations after machining waffle construction of the shell. In that case, size characteristics go beyond tolerance field. Waffle constructions are widely used in aviation and rocket science, because thin-walled constructions allow decreasing mass of products. Results of calculations of standard machining parameters are given in the article. Review of literature sources allow to summarize the main solutions of the problems with deformations. Author has made a conclusion of technological restrictions and field of application of selected approaches.

10-Paper ID: 36

Title: Effect of NaOH concentration on the Microstructure and Mechanical properties of the PEO coatings on Mg-Al3-Zn1 alloy

Authors: Zeeshan Ur Rehman, Dong jin Choi

Department: Hongik University, South Korea

Abstract: In this work, the effect of NaOH concentration on the properties of PEO coatings formed on AZ31B Mg alloy is studied. Composition and structure analysis of coatings were carried out by XRD and SEM. From the results, it was found that the number of pores, defects and width of the discharge traces are highly dependent on NaOH concentration. Major phases of the coating identified from XRD were consisted of MgO and Mg_2SiO_4. The crystallinity of the coatings and magnitude of MgO phase was highly incremented with NaOH concentration. From the Vickers hardness test it was observed that hardness of the coatings prepared in 2g/l of NaOH have the highest values~1050HV, with peak wear resistance values.

15:00-15:30	Coffee Break & Poster Session

Session 2(15:30-18:00)

1-Paper ID: 39

Title: Preparation, Characterization and In Vitro Release Study of Microcapsule Simvastatin using Biodegradable Polymeric Blend of Poly(L-Lactic Acid and Poly(ε-caprolactone) with Double Emulsifier

Authors: Findi Citra Kusumasari, Lukmanul Hakim S., Emil Budianto

Department: Polymer Research Group, Department of Chemistry, Faculty of Mathematics and Natural Sciences, University Indonesia

Abstract: Simvastatin is a cholesterol-lowering agent that inhibits the microsomal activity of 3-hydroxy-3-methylglutaril-CoA-reductase (HMG-CoA reductase), enzyme that contributes in biosynthesis cholesterol. Simvastatin has short half-life elimination about 2 hours and low solubility, this condition makes its bioavailability to be quite small. Simvastatin has adverse effect such as myopathy and rhabdomyolysis because of higher dose consumption of simvastatin. Controlled drug delivery system is needed to reduce the adverse effect. One of method that is used in drug delivery system is encapsulation using biodegradable polymer such as poly(L-lactic acid) and poly(ε-caprolactone). PLLA and PCL was blended with fix composition PLLA : PCL 60 : 40 (%w/w) by solvent evaporation technique using Tween 80 and Span 80 as emulsifier. Based on the optimization, the best encapsulation efficiency microcapsules were obtained at concentration of Tween 80 0.025% (v/v), Span 80 1% (v/v) with stirring speed at 900 rpm for 1 hour. The encapsulation efficiency was 83.67%. The best microcapsules were dissolved in dissolution media to get drug release profile. The percentage of drug release at pH 1.2 was 0.86% for 3 hours and in the phosphate buffer solution pH 7.4 for 12.22% for 52 hours.

2-Paper ID: PM215

Title: Study on a new kind of magnetic abrasive finishing by using alternating magnetic field for ultra-precision plane finishing

Authors: Chaowen DONG , Yanhua ZOU, Huijun Xie

Department: Utsunomiya University, Japan

Abstract: In this study, a new plane magnetic abrasive finishing method by using alternating magnetic field has been proposed to solve the problems such as the easy deformation and poorly restored of the magnetic brush in traditional magnetic abrasive finishing. Compared with the magnetic brush in traditional magnetic abrasive finishing, the magnetic brush can keep a relatively stable shape to finish the workpiece under the action of alternating magnetic field. In this paper, the variation of the finishing force in

the alternating magnetic field is analyzed theoretically. In addition, in order to get the ultra-precision plane surface, the influence of the size of the magnetic particles, the size of the GC particles, and the frequency of the AC power on the finishing characteristics has been studied. The best experimental results show that the surface roughness of the workpiece is improved from 38 nm Ra to 6.33 nm Ra.

3-Paper ID: 9

Title: Simulation Study of Deep Drawing Process

Authors: Jaber Abu Qudeiri, Aiman Ziout, Muneir Alsayyed, Ammar Alzarooni, Faris Safieh, Ahmed Al Hatti, Amjad Al Hassan

Department: UAE University, United Arab Emirates

Abstract: Deep drawing process is one of the important processes in sheet metal forming. One of the challenge that faces the deep drawing process is selecting the optimal values of process parameters for the deep drawing process. In order to find the optimum values of these parameters, it is necessary to study their influence on the deformation behaviour of the sheet metal. This paper develops a simulation model for deep drawing process based on Simufact sheet metal forming module to study the effect process parameters on the deep-drawing characteristics. The study also obtained the distribution of strain on the drawn product. Three process parameters are considered in this study namely, punch radius, die radius and clearance, the effect of these process parameter on the required force as well as on the quality of the product are investigated.

4-Paper ID: 34

Title: Optimization of machining time and surface quality of AISI D2 tool steel in WEDM using Taguchi methodology

Authors: Carmita Camposeco-Negrete, Juan de Dios Calderón-Nájera

Department: Tecnologico de Monterrey, School of Engineering and Science, México

Abstract: One of the non-conventional machining processes widely used in the industry is the wire electrical discharge machining (WEDM). This process has many advantages, like the great precision and quality that can be achieved. As well as other manufacturing operations, the success of the process relies on a correct selection of the cutting parameters. The present paper outlines an experimental study to optimize the machining time and the surface roughness in WEDM of AISI D2 tool steel during roughing machining. The Taguchi methodology was used to evaluate the effects and contributions of the pulse-in time, pulse-off time, servo voltage, and wire speed, on the response variables. The desirability method was employed to define a set of cutting parameters

that allowed reducing both machining time and surface roughness at the same time. The pulse-on time was the most significant factor for reducing the machining time, followed by the servo voltage, the pulse-off time and the wire speed. For surface roughness, the pulse-off time was the factor with the greatest influence over the response variable. The optimization performed showed that the machining time was reduced by 4.65%, and the surface roughness was diminished by 4.60% when compared with the initial values that are commonly used in the machining of AISI D2 tool steel. Therefore, greater production rates could be achieved without compromising the quality of the machined parts.

5-Paper ID: 37

Title: Interfacial Behaviors of Transmembrane Peptides in Lipid Bilayer Studied by X-ray and Neutron Reflectivity

Authors: Dongjin Choi, Zeeshan Ur Rehman

Department: Hongik University, South Korea

Abstract: Lipids and proteins can influence each other in so many different ways. Lipids may affect the structure of membrane proteins by influencing their backbone conformation, the tilt, rotation angles of their transmembrane (TM) segments, and the orientation of their side chains. The membrane-spanning parts in integral membrane proteins are predominantly hydrophobic, and most often helical. At the lipid-protein interface, the TM part of the protein and the hydrocarbon chains of the lipid molecules have to coexist to maintain the integrity of the membrane. Lipids are important components of lipid membrane are used in various experiments reported in this thesis and can act as model lipid bilayers. Once they support on solid substrate like silicon wafers, their structural properties can investigate by X-ray and neutron reflectivity and by other useful techniques. Reflectivity technique can provide detailed information such as their thickness and interaction between lipids and peptides. The thesis reports a detailed investigation of these lipids and peptides by X-ray and neutron reflection techniques

6-Paper ID: 54

Title: Solution strengthening the Ti-6Al-4V joints were brazed by Ti-15Cu-15Ni and Ag-26.7Cu-4.5Ti filler foils

Authors: Kuo-Hsun Lee, Sen-Yeu Yang

Department: National Taiwan University

Abstract: Using the optimal solution and aging treatment for Ti-6Al-4V brazed by Ti-15Cu-15Ni and Ag-26.7Cu-4.5Ti fillers, the average shear strengths of the lap-joint interface are improved. And the average grain sizes and the average lengths of Widmanstätten structure are significantly smaller than that of post-brazed annealing. Both fillers specimens are examined to indicate the strengthening mechanism is to homogenize the microstructure of Ti-6Al-4V joints to simultaneously enhance the strength of joint braze and substrate.

7-Paper ID: 49

Title: Design of Solar Collectors for Medium Temperature Applications

Authors: Ishana Nasuha Ihsham Shah Chandran Abdullah, Siti Ujila Masuri, Dong-Won Jung

Department: Universiti Putra Malaysia, Jeju National University

Abstract: Solar thermal energy can be an impactful replacement for fossil fuel because it is clean and sustainable. Solar collector is one of the ways to harness solar thermal energy for clean and sustainable environment. Among many, Medium Temperature Solar Collector (MTSC) is widely used in industry for medium temperature applications (100°C-300°C). However, the current design configuration is very costly which results in its underuse and most recent studies did not focus on economic analysis upon proposing the designs. Therefore, this study proposes a new design of solar collector with high thermal performance at minimum cost as indicated by the value of thermal efficiency, th and Levelized Cost of Heat (LCOH), respectively. A design of Compound Parabolic Collector (CPC) with lined absorber was proposed and simulated using ANSYS software to determine the th and LCOH values. Results show an improvement of 53% in th with lowest value of LCOH (RM0.10/kWh) as compared to previous studies including the recent one.

8-Paper ID: PM219

Title: Structure load calculation for Essential ESW Intake Structure /CCW HX Building Chilled Water Compression Tank

Authors: Muhammad Sajjad, Dong Won Jung

Department: Jeju National University, South Korea

Abstract: Interest in studying of the shell arises from the fifties of twentieth century. The assemblies, containing thin shells, find wide use in the modern engineering, especially in ships, aircraft and spacecraft industry. The shell vibrations and buckling modes are analyzed by means of numerical methods, to clarify qualitatively the critical loads and different buckling modes. In today's aerospace and aircraft industries, structural efficiency is the main concern. In our study we focus on the experimental analysis of axial loading for static and buckling analysis for pressure vessel. The modeling and the analysis both are carried out in Ansys 15.0 solver. The analysis provides the stresses for the saddle support & shell near the saddle support due to upset (OBE) and faulted (SSE) seismic load conditions. By using data collected from these simulations result we can design and manufacture our require vessel without risk of safety during operation conditions.

9-Paper ID: PM220

Title: Back propagation artificial neural network approach to predict the flow stress in isothermal tensile test of medium carbon steel material

Authors: Mohanraj Murugesan, Dong Won Jung

Department: Jeju National University, South Korea

Abstract: Isothermal tensile test of medium carbon steel material was conducted on a computer controlled servo-hydraulic testing machine at the deformation temperatures

(923 to 1223 K) and the strain rates (0.05 to 1.0 s-1). Using the experimental data, the artificial neural network (ANN) model with a back-propagation (BP) algorithm was proposed to predict the hot deformation behavior of medium carbon steel material. For the model training and testing purpose, deformation temperature, strain rate and strain data were considered as inputs and in addition, the flow stress data were used a targets. Before running the neural network, the test data were normalized to effectively run the problem and after solving the problem, the obtained results were again converted in order to achieve the actual data. According to the predicted results, the coefficient of determination (R2) and the average absolute relative error between the predicted flow stress and the experimental data were determined as 0.997 and 0.913%, respectively. In addition, by evaluating each test conditions, it was found that the average absolute relative error based on an ANN model varied from 0.55% to 1.36% and moreover, the results showed the better predictability compared with the measured data. Overall, the trained BP-ANN model is found to be much more efficient and accurate by means of flow stress prediction with respect to the experimental data for an entire tested conditions.

10-Paper ID: 17

Title: Fabrication, characterization and investigation of novel PVDF/ZnO and PVDF-TrFE/ZnO nanocomposites with enhanced β-phase and dielectricity

Authors: Mingran Liu

Department: Hong Kong Polytechnic University

Abstract: To date, flexible, sensitive and biocompatible pressure sensors for fluctuation signals in human body have been mainly demonstrated for detecting body and muscle motion, pulse rate, heart rate and arterial blood pressure. However, because of the lack of sufficient sensitivity and flexibility, pulse signals with relatively low intensity cannot be identified and captured, such as signals derived from microcirculation in human body. As confirmed and validated by researchers, once PVDF and its copolymer based nanocomposite sensing material are applied in piezoelectric sensors, its sensitivity and piezoelectricity are highly relevant. Therefore, as one of the most effective methods to improve the permittivity and piezoelectricity of PVDF and its copolymer based nanocomposite, the effect of increasing the content of β-phase crystal was investigated in this work. In this project, the sensor possessing a novel sensing layer with the nano-filler was investigated and fabricated. The proposed sensor was designed in a simple but efficient sandwich structure. The sensing layer of the proposed sensor was made of polyvinylidene fluoride (PVDF) and polyvinylidenefluoride-trifluoroethylene (PVDF-TrFE) based nanocomposite with Zinc Oxide (ZnO) nanostructure acting as a filler portion which was fabricated by the method of Chemical Bath Deposition (CBD). The fabricated nanocomposite sensing layers were characterized. The microstructures and morphologies of pristine PVDF (P), PVDF-TrFE (PT), PVDF/ZnO (P/Z) and PVDF-TrFE/ZnO (PT/Z) with different concentration were characterized by Scanning Electron Microscope (SEM). The degree of crystallinity for P, PT, P/Z and PT/Z was obtained by X-ray Diffraction meter (XRD). In conclusion, PT exhibited better performance in both morphology and crystallinity as a sensing membrane material. More β-phase in PT was obtained than that in P. ZnO, as a semiconductor filler, would have substantial influence on enhancing the dielectric constant by acting as a nucleating agent and forming a nanostructure with large aspect ratio.

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Title: Photocatalytic VOCs decomposition for manned spacecraft

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Abstract: In manned spacecraft environmental control and life support system (ECLSS) is a group of interconnected or standalone devices and systems that allow human to survive in space for long term exploration. Therefore, design and development of these devices very important for human health and space mission. Generally ECLSS consists of several main components such as, atmosphere revitalization (CO_2 removal/reduction, O_2 generation/supply, trace contaminant monitoring and control, microorganism control), water recovery and management (water storage & distribution, water recovery, water quality monitoring). Many researches have been focused on utilization of TiO_2 photocatalyst water/air purification and contaminant/microorganisms cleaning in life support systems of spacecrafts. Conventionally, powdered TiO_2 photocatalyst is used with mesoporous SBA-15, which limits the photocatalytic reaction due to the small surface are. Thus, development and application of nano-sized TiO_2 structures, such as nanotubes and nanorods is advantageous Thus in this study nanostructures carbon coated Cu/Ni alloy NPs on TiO_2/SBA-15 composites will be developed and tested for different parts of the trace contaminant system in ECLSS. In first step photocatalytic oxygen generation using carbon coated Cu/Ni NPs/TiO_2-IrO_2/SBA-15 photoelectrodes will be performed as an alternative method to the conventional water electrolysis one. In second and third step CO_2 reduction and water recovery systems using carbon coated Cu/Ni NPs/TiO_2 nanotubes(NTs)/SBA-15 will be developed and tested, respectively. In fourth step, air purification systems will be developed. In final step carbon coated Cu/Ni NPs/TiO_2 NTs/SBA-15 with or without co-catalyst (Pt, Ag) will be employed to develop photocatalytic decomposition of VOCs and antibacterial systems.

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