X-ACADEMY ICMSSM2020 WEBINAR

2020 6th International Conference on Mechanical Structures and Smart Materials (ICMSSM2020)

On Zoom

July 25-26, 2020

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Simple Version of the Schedule

ICMSSM2020 WEBINAR					
programme detial on July 26, 2020 (Sunday)					
Vietnam & Indonesia Standard Time	India	Germany	China & Malaysia	Japan	Australia
13:00	11:30	8:00	14:00	15:00	16:00

13:00-16:50	**Keynote Session**
13:00-13:30	**Keynote speech 1: Prof. Jayakumar Jayaraman** *Effect of High Energy Ball Milling on Reinforcement of MWCNTs in Magnesium Nano Composites*
13:30-14:00	**Keynote speech 2: Prof. Ji Wang** *Vibration Analysis of Combinations of Curved and Periodic Beams*
14:00-14:30	**Keynote speech 3: Ass. Prof. Takahiro Matsueda** *Detection techniques of micro crack behavior in flexible solar cell for safely mechanical design*
14:30-15:00	**Keynote speech 4: Prof. Alois K. Schlarb** *Smart Tribology Materials and Testing*
15:00-15:10	**Break Time**
15:10-15:40	**Keynote speech 5: Prof. Katsuyuki Kida** *Crack growth mechanism of silicon nitride ball bearing under cyclic contact loading*
15:40-16:10	**Keynote speech 6: Ass. Prof. Koshiro Mizobe** *Effect of water and dry conditions on tribological properties of UV curable resin thrust bearings made by additive manufacturing*
16:10-16:40	**Keynote speech 7: Assoc. Prof. Dr. Aidah Jumahat** *Mechanical Properties of Advanced Metal Mesh Composite Laminates*
16:40-18:00	**Paper Session**

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2. The standard time for all programs is **Vietnam Time**.

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4. If you want to deliver oral presentation but your paper is not in the session list, please contact us by Email: cfp@icmssm.org (for ICMSSM2020)

Instruction about Oral Presentation

Materials Provided by the Presenters:

PowerPoint or PDF files

Duration of each Presentation:

Regular Oral Session: about **7-10 Minutes** of Presentation and **1-2 Minutes** of Q&A.

Keynote Speech

July 26, 2020 (13:00-13:30)

Keynote speech 1

Prof. Jayakumar Jayaraman

Principal of G.H.Raisoni College of Engineering & Management, Chas, Ahmednagar, Maharashtra, India

Speech Title: Effect of High Energy Ball Milling on Reinforcement of MWCNTs in Magnesium Nano Composites

Prof. JAYAKUMAR JAYARAMAN Completed PhD from Annamalai University, Tamilnadu, India and graduations from University of Pune. Having 27 years of vast experience in teaching and research. Presently working as Principal in G.H.Raisoni College of Engineering, Ahmednagar, Maharashtra, India. He has completed many research projects, granted through AICTE, BCUD-SPPU. His area of research interest are Synthesis of Metal Matrix Nano Composites, Nano Materials, Ball milling, Vaccuum Stir Casting, Disintegrated melt deposition.

He has supervised about 60 undergraduate projects and 15 post graduate projects. Adding to his credit he has also examined 2UG and 2PG projects of Wits Watersrand University, Johannesberg, South Africa. He has published around 20 research papers in National and International journals and attended many conferences and delivered key note speeches in India as well at Bangkok, Thailand and Kualalumpur, Malaysia. He is a Life Member of Indian Society for Technical Education (LMISTE), Fellow Member of Institution of Engineers (FIE), Fellow member of Indian Society of Mechanical Engineers (FISME), Life Member of Powder Metallurgy Association of India (PMAI), Member of International Association of Computer Science and Information Technology (ISCSIT).

July 26, 2020 (13:30-14:00)

Keynote speech 2

Prof. Ji Wang

Department of Mechanics and Engineering Science, Ningbo University, China

Speech Title: Vibration Analysis of Combinations of Curved and Periodic Beams

Professor Ji Wang has been a Qianjiang Fellow Professor of Zhejiang Province at Ningbo University since 2002. He also served as Associate Dean for Research and Graduate, School of Mechanical Engineering and Mechanics, Ningbo University, from 2013 to 2019. Professor Ji Wang is the founding director of the Piezoelectric Device Laboratory, which is a designated Key Laboratory of City of Ningbo. Professor Ji Wang was employed at SaRonix, Menlo Park, CA, as a senior engineer from 2001 to 2002; NetFront Communications, Sunnyvale, CA, as senior engineer and manager from 1999 to 2001; Epson Palo Alto Laboratory, Palo Alto, CA, as Senior Member of Technical Staff from 1995 to 1999. Professor Ji Wang also held visiting positions at Chiba University, University of Nebraska-Lincoln, and Argonne National Laboratory. He received his PhD and Master degrees from Princeton University in 1996 and 1993 and bachelor from Gansu University of Technology in 1983.

Professor Wang has been working on acoustic waves and high frequency vibrations of elastic and piezoelectric solids for resonator design and analysis with several US and Chinese patents, over 120 journal papers, and frequent invited, keynote, and plenary presentations in major conferences around world. He has been board members, advisors, and consultants to many leading companies in acoustic wave device industry. Professor Wang has been a member of many international conference committees and currently serving the IEEE UFFC Technical Program Committees of the Frequency Control and Ultrasonics Symposia, the IEEE MTT-S, and the IEC TC-49. He is also the funding chair of Committee on Mechanics of Electronic and Magnetic Devices, CSTAM, and the SPAWDA. From 2015, Profess Wang is the editor-in-chief of Structural Longevity and members of the editorial boards of several international journals.

July 26, 2020 (14:00-14:30)

Keynote speech 3

Ass. Prof. Takahiro Matsueda
University of Toyama, Japan
Speech Title: Detection techniques of micro crack behavior in flexible solar cell for safely mechanical design

Takahiro Matsueda is an assistant professor in the Department of Mechanical Engineering at the University of Toyama, Japan. He has investigated evaluation of fatigue strength of steel, stress intensity factors of microcrack, nondestructive testing and evaluation of material strength such as solar cell, ceramics and polymer.Takahiro Matsueda graduated from mechanical engineering at Kyushu University, Japan, in 2014. He majored in evaluation method of fatigue strength with notched steel in a PhD course. He was an assistant professor in the Department of Mechanical Engineering at the Tokyo Metropolitan University from 2015 to 2019. He has been an assistant professor in the Department of Mechanical Engineering at the University of Toyama from 2020. He has also won awards for research from international committees (ICSMMS, ICMEMSCE and ICMTM).

Brief introductions of current research topics are as follows.

Nondestructive evaluation of materials using AE and LT techniques

Takahiro Matsueda's research aims to reveal the mechanisms of microcrack initiation and accumulation, and their contribution to the electrical degradation during fatigue fracture. He detected and identified microcrack initiation using the acoustic emission (AE) and Lock-in thermography (LT) techniques. The electrical degradation of solar cell was evaluated by monitoring electrical power calculated from Current-Voltage (I-V) curve. Furthermore, microdamage contributing to the electrical degradation were identified by Lock-in thermography (LT). He proposed the method to evaluate microcrack initiation using the AE, LT and I-V curve.

Prediction method of fatigue limit in metal materials

Takahiro Matsueda is studying the new prediction method based on fracture mechanics for safely design. In particular, he focuses on improvement of the method to define the fatigue crack shape and propagating during fatigue test.

July 26, 2020 (14:30-15:00)

Keynote speech 4

Prof. Alois K. SCHLARB
Technische Universität Kaiserslautern, Professor, Department Head "Chair of Composite Engineering"
Speech Title: Smart Tribology Materials and Testing

Professor Schlarb currently holds the Chair of Composite Engineering (CCe) at the Technische Universität Kaiserslautern (TUK), Germany. He studied mechanical engineering at the University of Kaiserslautern, specializing in production engineering and company organization. After his graduation in 1984 he relocated to the University of Kassel, working as scientific assistant to Prof. Dr.-Ing. Dr. e.h. Ehrenstein. He was awarded a doctorate in 1989 for his thesis on polymer processing. From 1988 until 1989 he was also head engineer at the university's Institut fuer Werkstofftechnik. In the following 13 years Professor Schlarb held different positions in the industry, e.g. the polymer laboratory of BASF SE, Germany, as material scientist and project manager researching composites, last as Vice President and head of marketing, research and development with B. Braun Medical AG, Switzerland. In November 2002 Alois Schlarb was appointed to a full professorship for "Composite Materials" at the TUK and from 2002 to 2008 Chief Executive Officer of the Institut für Verbundwerkstoffe GmbH. Since 2018 Professor Schlarb also holds a visiting professorship at Qingdao University of Science and Technology, Qingdao, PR China. Professor Schlarb served as Spokesman of the Scientific Alliance of Polymer Technology (WAK) from 2009 - 2015 and as President of the Society for the Advancement of Materials and Processing Engineering SAMPE Deutschland e.V. from 2003 - 2015. He is member of the editorial boards for the Journal of Composite Materials, and Strain - International Journal for Experimental Mechanics, SAMPE-Journal, and the Journal of Polymer Technology.

He has given more than 200 presentations, has authored or co-authored more than 100 journal papers, edited or authored or co-authored more than 50 book chapters or books, and is listed in more than 50 patent applications as inventor.

The focus of his research activities is on process-structure-property-relations and tribology of polymer based hybrid materials.

15:00-15:10	Break Time

July 26, 2020 (15:10-15:40)

Keynote speech 5

Prof. Katsuyuki Kida

Solid Mechanics Laboratory, University of Toyama, Japan

Speech Title: Crack growth mechanism of silicon nitride ball bearing under cyclic contact loading

Professor Katsuyuki Kida was born in 1968 in Osaka, where he studied mechanical engineering at Osaka University from 1988. Apart from course work, he studied rolling contact fatigue (RCF) occurring in TiC and TiN coated steels using both X-ray diffraction and scanning acoustic microscopy. After graduation he pursued his academic career and obtained a Ph.D. in engineering mechanics in 2000, investigating RCF problems of all-Si3N4 bearings. By observing cracking and flaking failure under RCF, he succeeded in explaining the material`s features from the viewpoint of fracture mechanics. From 2000 he focused his work on investigating the contact problems of several materials used in machine elements. He has also continued fundamental research on contact problems, for which he received 'The Best Paper Prize (FFEMS PRIZE)' from 'Fatigue & Fracture of Engineering Materials & Structures' journal in 2005. The awarded papers reported establishing a crack growth mechanism under contact pressure, a problem previously unsolved for over 70 years since S. Way's proposed theory. His research interests now include the development of three dimensional scanning Hall-probe microscope technologies, fatigue phenomena in polymer bearing, crack growth mechanism under contact stresses and refinement of high-carbon steels. He holds and has held a number of prestigious leadership roles in academy-industry corroboration programs: refinement of steels, new joint system in humanoid robots and fatigue of polymer bearings in "Strategic Fundamental Technologies

Strengthening Assistance Programs" (Ministry of Economics, Trade and Industry, Japan, 2009-2013); scanning Hall-probe microscopy in "Fundamental Studies on Technologies for Steel Materials with Enhanced Strength and Functions" (Consortium of the JRCM, Japan, 2008-2012); and ceramic bearing elements in the project supported by "Japanese Energy and Industrial Technology Development Organization" (NEDO, Japan, 2007-2011).” As a chairperson of department of mechanical engineering in University of Toyama, Professor Kida is heading education and research projects (2019-)..

July 26, 2020 (15:40-16:10)

Keynote speech 6

Ass. Prof. Koshiro Mizobe
Department of Mechanical and Intellectual Systems Engineering, University of Toyama, Japan

Speech Title: Effect of water and dry conditions on tribological properties of UV curable resin thrust bearings made by additive manufacturing

Since 2011, through more than 40 papers, Prof. Mizobe has studied the effect of repeated heating on the microstructures near the inclusion in order to develop the technique to improve fatigue strength. He investigated this important behavior taking into consideration the following factors: the type of inclusions in the steel; the formation of nonmetallic inclusions; the number of the times the material was heated; the various heating methods (induction heating and/or heating in a furnace); and the amount of retained austenite.

Furthermore, he investigated the properties of bearings which consist of polymer races and a PTFE retainer in non-lubricating and corrosive conditions. He constructed the P-V diagram (rotation speed vs thrust load) which showed the safe working conditions for polymer bearings. This information is important for the design of polymer bearings under rolling contact fatigue. He also clarified the mechanism of wear debris generation and its adhesion to the contact surface. The evaluation of steel microstructures needs a high level of skill and experiences. In conjunction with a mathematician, he developed homology analysis system which is applicable to the microstructures of steel. This method can automatically evaluate the complex evaluations.

July 26, 2020 (16:10-16:40)

Keynote speech 7

Assoc. Prof. Dr. Aidah Jumahat
Universiti Teknologi MARA, Malaysia
Speech Title: Mechanical Properties of Advanced Metal Mesh Composite Laminates

Jumahat A is an Associate Professor of the Faculty of Mechanical Engineering at Universiti Teknologi MARA (UiTM) Malaysia. She has been giving lectures on Composite Materials, Finite Element Method, Mechanics of Materials, Manufacturing Processes, Engineering Design and Advanced Materials, which happens to be her areas of research interest, since 2001. She also currently serves as Director of Community of Research for Frontier Materials and Industrial Applications at the Deputy Vice Chancellor Office UiTM since 2016. She received her MSc degree (2002) and B.Eng. (Hons.) degree in Mechanical and Materials Engineering (1999) from the Universiti Kebangsaan Malaysia. She received her Ph.D. degree in Mechanical Engineering from the University of Sheffield United Kingdom in 2011. She has published more than 200 technical papers in journals, chapters in book and conference proceedings locally and internationally in materials and mechanical engineering research areas.

Session List

July 26, 2020 (16:40-18:00)

Paper Session

1. Paper ID: 27

Title: Optical Properties Improvement of Recycled Polypropylene with Material Value Conservation Schemes Using Virgin Plastic Blends

Authors: Djoko Sihono Gabriel and Husen Nasrullah

Abstract: Repetitive implementation of material value conservation (MVC) in plastic packaging may lead to good quality plastic waste and high acceptance for secondary recycling. This makes the obtained recycled plastic pellets has good quality and can be used as an alternative raw material for new products. However, treatments and processing in the recycling processes can lead to the degradation of material properties and disrupt the recycled plastics life cycle to be used for new products with high specifications. Recycled plastics are certainly cheaper than virgin plastics, but they have low properties, contaminated, and are only used for low-value products. Therefore, a solution is needed for this problem. This study proposed mixing recycled and virgin plastic pellets to improve recycled plastics whose optical properties have been subjected to quality degradation. A series of tests were carried out on specimens and tested according to the American Society for Testing and Materials (ASTM) method. The optical properties tested were transparency, gloss, and color. This study revealed that optical properties had an increasing trend along with the large number of virgin plastic pellets added to the blends. The optimal composition was found in the 50:50 composition of virgin-recycled plastic pellets to the 70:30 composition of virgin-recycled plastic pellets. Information in this study can be used as a reference to improve the optical properties of recycled plastics. In addition, the widespread implementation of MVC can improve the quality of plastic waste and strengthen its acceptance for secondary recycling.

2. Paper ID: SM643

Title: Places and Causes of Mismanaged Plastic Materials in the Life Cycle of Flexible Plastic Packaging based on Mechanical Recycling Context

Authors: Munzir Hadengganan and Djoko Sihono Gabriel

Abstract: Plastic waste has become a big issue in the world for its large amount of plastic waste in the sea. Most of the plastic waste is plastic packaging which consists of flexible and rigid plastic packaging. This research discusses flexible plastic packaging. Until now, most researches on the loss of plastic materials discuss how to manage plastic waste disposal once it has been used by community: only a few discuss production cycle: while none of them discusses flexible plastic packaging area. This research aims to examine the number of mismanaged materials throughout flexible plastic packaging life cycle using a combination of Material Flow Analysis (MFA) and Life Cycle Analysis (LCA). Based on the literature review, interviews and observations conducted by the author to all stakeholders

in the life cycle of flexible plastic packaging, mismanagement of plastic material occurred in each cycle, mostly caused by quality degradation of flexible plastic that could cause plastic waste was not acceptable in the mechanical recycle. The results of this study show that: (1) mismanaged material occurred in all cycles throughout the life cycles of flexible plastic packaging, (2) quality degradation is the main caused of mismanaged material in several cycles, and (3) the mismanaged materials in the life cycle of flexible plastic packaging were 98.29%.

3. Paper ID: SM646

Title: Friction coefficient and wear of PEEK-PTFE hybrid radial ball bearings under dry conditions

Authors: Kazutoshi Hiraki, Koshiro Mizobe, Takahiro Matsueda, Yuji Kashima and Katsuyuki Kida

Abstract: In this paper, in order to investigate friction coefficient and wear of PEEK-PTFE hybrid radial bearings, rolling contact fatigue tests were performed under radial loads ranging from 93N to 387N at 600rpm in dry conditions. It was found that friction coefficients were 0.013 to 0.032 throughout the tests. Operation temperature followed the change in the friction coefficient, and PEEK-PTFE radial ball bearings exhibited stable performance even though the temperature locally approached 100 ℃ due to frictional heat. Moreover, wear loss of bearing components excluding alumina balls increased exponentially with increase of load.

4. Paper ID: SM647

Title: Crack growth evaluation of induction quenched JIS-S45C based on stress intensity factor simulation

Authors: Takahiro MATSUEDA, Ayumu TAMURA, Koshiro MIZOBE, Katsuyuki KIDA

Abstract: Problems remain in fatigue fracture for safely design of members and structures. In this study, rotating bending test was performed to investigate the fatigue crack propagation behavior of induction quenched and tempered JIS S45C low carbon steel. Hardness distribution, microstructure in cross section and fracture surface were observed with a Vickers hardness test machine, an optical microscope and a scanning electron microscope. The depth of hardened boundary was approximately 1mm from surface and formation into martensite occurred at the surface of the specimen. It was ascertained that fracture surface of notched specimen consisted of five fracture types. In addition, maximum stress intensity factor of fatigue crack during rotating bending test in notched specimen increased. The relation between SIF and the fracture surface was discussed.

5. Paper ID: 28

Title: Impact of Repetitive Recycling on Optical Properties of Virgin and Recycled Polypropylene Blends Based on Material Value Conservation Paradigm

Authors: Djoko Sihono Gabriel and Roben Hotdysah Putra Saragih

Abstract: Implementation of material value conservation (MVC) needs to be proven through research to determine impact upon plastic properties such as optical properties of virgin plastic and recycled plastic blends. Optical properties such as color, transparency and gloss are important parameters for appropriate quality of plastic packaging.

Degradation of optical properties occurs during recycling processes of plastic materials and the declining properties of recycled products could be improved by blending them with virgin materials. This research aims to reveal the impact of repetitive recycling on optical properties of virgin and recycled polypropylene (PP) blends based on MVC paradigm. The first step of this research was to determine composition of virgin PP and recycled PP blends. Proportion of 70% virgin PP and 30% recycled PP was selected as a blend composition. The next step of this research was repetitive recycling of virgin PP and recycled PP blends with implementation of MVC up to the 8th recycling stage. The specimens of plastic blends were made from the 1st, 2nd, 4th and the 8th recycling stages and then their optical properties were tested with the American Society for Testing Materials (ASTM) methods. Generally, degradation level of optical properties will increase during the recycling processes. Testing results show a slightly change of color properties. Degradation level of gloss properties is gradually increased by a maximum degradation level at the 8th recycling stage as 17.46%. However, transparency had a maximum degradation level at the 4th recycling stage as 20.93%. It means that the plastic blends can be used as viable raw materials based on their optical properties with more attention to the gloss. Furthermore, the implementation of MVC will provide more benefits through extending the life cycle of recycled products, reducing virgin plastic consumption, optimizing the use of plastic waste and reducing plastic waste generation.

6. Paper ID: SM648

Title: Observation of surface and subsurface crack propagation in PPS thrust bearings under rolling contact fatigue in water

Authors: Syunsuke Mizozoe, Takahiro Matsueda, Katsuyuki Kida and Yuji Kashima

Abstract: In this study, crack propagation in PPS thrust bearings under rolling contact fatigue (RCF) in water was observed in order to investigate the relation between cracks and flakings. RCF tests in water under loads of 700 N and 900 N were performed. The semi-circular cracks propagated in a direction perpendicular to the rolling direction were observed under a load of 700 N. The line cracks propagated in a direction parallel to the rolling direction at periphery of contact area and the semi-circular cracks were observed under a load of 900 N. To study the subsurface cracks, full section of rolling contact area was observed. It is concluded that the flaking mechanism in PPS thrust bearing has three features as follows: Initiation and propagation of surface cracks depend on the load; When load is 700N, the semi-circular cracks growing from the surface and the cracks branching from the main subsurface cracks join to form the flaking; When load is 900N the line cracks and the semi-circular cracks growing from the surface join to form the flaking.

7. Paper ID: SM650

Title: Contact temperature calibration of PPS thrust bearings under dry condition

Authors: Hiroya Nihon'yanagi, Takahiro Matsueda, Katsutuki Kida and Yuji Kashima

Abstract: In the present study, Rolling Contact Fatigue (RCF) tests of Poly-phenylene-sulfide (PPS) thrust bearings under dry condition were carried out, and the relationship between failure, bearings life and temperature was studied. Furthermore, in order to investigate maximum PPS thrust bearings temperature, calibration data was obtained

between contact temperature of rolling element and Infrared (IR) temperature on the side of top race. It is concluded that the contact temperature of failure PPS bearing was higher than a glass transition point and it was lower than a melting point.

E-Poster Session

1. Paper ID: 4

Title: Investigation of Optimal Esterification Conditions of Lactic Acid with Butanol by Using Response Surface Methodology

Authors: Meng Jun Zheng, Hsin-Chi Tseng, Bo Yao Chiu, Wei-Cheng Hung and Richard S. Horng

Abstract: Esterification reaction of lactic acid with butanol to produce butyl lactate and its optimal conditions were investigated. Cyclohexane was used as entrainer to remove water to promote reaction yield. Catalyst of $NaHSO_4$ was also used to increase reaction rate. Reaction parameters of butanol/lactic acid ratio, cyclohexane/lactic acid ratio, catalyst amount, and reaction time were optimized using Response Surface Methodology (RSM). Results showed that the butanol/lactic acid ratio was the most significant factor for esterification yield while interactions between butanol/lactic acid ratio and cyclohexane/lactic acid ratio, butanol/lactic acid ratio, and reaction time were less significant. The correlation coefficient between predicted values and experiment values was 0.985. The optimal conditions for the experiment are: ethanol/lactic acid ratio 5:1, cyclohexane/lactic acid ratio 1:1, catalyst loading 1.5%, and incubation period 3 hours. The esterification yield reaches 99.8% under these conditions.

2. Paper ID: SM605

Title: Modelling material parameters of selected composite structures of tires

Authors: Jiri Stodola, Alena Breznicka, Petr Stodola, Jan Furch

Abstract: The paper presents selected results of experimental and computational modelling of composite material samples of tires with cord ply (casing) and breaker textile reinforcement. The computational modelling included applications of finite element methods. The output is to determine and verify the influence of material parameters of textile reinforcement. The results were confirmed by the experiment and computational modelling verification. For elastomeric matrices hyperelastic behavioural patterns of this material were considered.

3. Paper ID: 8

Title: Accelerated testing of track vehicle torsion bar

Authors: Jan Furch, Quy Hung Nguyen, Jiri Stodola

Abstract: The suspension system of track vehicles is often equipped with torsion bars. The torsion bar is a key element of the vehicle's suspension system. The service life of torsion bars depends primarily on the quality of the material used, the diameter of the torsion bars and the method of attachment and placement. In order to obtain the characteristics of the torsion bar, an experimental test stand was created on which accelerated tests were performed. Furthermore, a virtual model of torsion bar operation was created. The torsion bar was modelled using finite elements (FE part). Dynamic simulation was performed using MSC Adams software. Finally, the values measured in the

accelerated tests and the results of simulations were compared. Comparing the values found, it was proved that this difference is not significant. This virtual model can be used to investigate the service life of torsion bars and to predict their service life.

4. Paper ID: SM609

Title: Investigation of using multi-hydroxyl ionic liquid polymer as catalyst to produce propylene carbonate

Authors: Richard S. Horng, Wei-Cheng Hung and Ju-Wei. Kuo

Abstract: Ionic liquid with a single hydroxyl group, 1-(2-hydroxyl-ethyl)-3-methylimidazolium bromide (HEMIMB), was prepared. It was found that HEMIMB could be an efficient catalyst for CO2 cycloaddition to propylene oxide to produce propylene carbonate (PC). An ionic liquid polymer with multi-hydroxyl groups poly (1-2-hydroxyl-ethyl)-3-vinylimidazolium bromide (PHEVIMB) was also prepared. In this study, both catalytic reaction performances of HEMIMB and PHEVIMB were investigated. Results showed that product separation and catalyst recycles in the process of PHEVIMB catalytic reaction system was much more efficient with a yield of 55.5%, even after three consecutive catalyst reuses. Meanwhile, the separation was less time-efficient for homogeneous catalytic system of HEMIMB molecules with a single hydroxyl group despite of a yield of 92.4%. When it comes to practical industrial process design, the single component with multifunctional ionic liquid polymer, as catalyst, may be considered effective and friendly process.

5. Paper ID: SM610

Title: Influence of Some Chemical Elements on SDAS of A357 alloy

Authors: Jiehua Pan， Kezhun He, Meng Wang and Jianmin Zeng

Abstract: A solidification model of coarsening coefficient for the criterion of secondary dendrite arm spacing has been established in this paper. When the model is applied to aluminum cast alloy, it is found that the model is in good agreement with the experiment results. Experiments and analysis show that addition of some chemical elements is conducive to the refinement of the secondary dendrite arm spacing under the same solidification condition. Different chemical elements have different refining effects, and Zr and Ti have better refining effect on A357 aluminum cast alloy than Cu.

6. Paper ID: SM613

Title: Honeycomb Structures Manufactured by a New Method and Its Failure Analysis

Authors: Lijun WANG and Kazuya SAITO

Abstract: Nowadays, honeycomb sandwich panle is widely used in the field of aircraft and spacecraft, due to its light weight, high strength and good impact resistance. So the stability and buckling behavior of the structure are crucially important. In the present work, two type aluminum honeycomb sandwich panles were manufactured by a new manufacturing method (i.e. a press and folding process). To evaluate the structural failure of the panle, the three-point bending test was carried out, and found that the face sheets and the honeycomb core were splited open under a local load, but the panle has not been completely failure. In addition, the buckling behavior of the panle was implemented with finite element analysis (FEA).

7. Paper ID: SM614

Title: Study on linear segregation of ZL205A alloy

Authors: Wu Hu, Ke Zhu, Wang Meng, Weidong Huang and Jianmin Zeng

Abstract: Linear segregation of high strength aluminum alloy ZL205A castings were studied by X-ray Nondestructive testing, scanning electron microscope and energy dispersive spectrometer. It is found that the linear segregation occurs at the large wall thickness of the casting and/or at the place where the wall thickness is in transition. Segregation element is mainly Cu, which exists as compound θ(Al2Cu) phase. The formation of linear segregation is related to the flow of Cu-rich melt in the late solidification period, while the occurrence of thermal cracks promotes the formation of linear segregation. The formation of linear segregation of the casting can be effectively prevented by eliminating hot spots of the casting, refining crystal grains and increasing solidification speed of the casting.

8. Paper ID: 18

Title: Simulation of Electrical Characteristics on Inhomogeneous Strains in Normally-off HEMTs with p-GaN Gate

Authors: Jing Zhou Hongjun, Chen Yang Wang and Xingming Long

Abstract: Strain is one of the important factors affecting the two-dimensional electron gas (2DEG) transform in AlGaN/GaN material based high electron mobility transistors (HEMTs) by polarization effects. In this paper, the effects of inhomogeneous biaxial strain in different regions of the AlGaN barrier layer on electrical properties of normally-off HEMTs with p-GaN gate were discussed. The results show that biaxial strain applied in three regions has different influence on transfer, output and breakdown characteristics of the device. The strain applied in region under gate has the most significant impact on threshold voltage and drain saturation current with a decreasing of 39% and an increasing of 97% respectively as the strained lattice constant increases from 3.173061Å to 3.187229Å . While, strain applied between gate and drain electrode can improve the off-state breakdown voltage by 12% with the increasing of strained lattice constant.

9. Paper ID: SM636

Title: Experimental Investigation of Forced Convective Heat Transfer in Circular Pipe with Wire Mesh Porous Media

Authors: Panuwat Chanmak, Bundit Krittacom, Pathiwat Waramit, and Rapeepong Peamsuwan

Abstract: This experimentation aims to study Nusselt number (Nu) and Friction factor (f) deriving from the forced flow of fluid inside a circular pipe under a uniform heat flux condition. Porous media used in this study is made of stainless steel wire mesh 304 which has the number of pores per inch (PPI) of 8. Reynolds number (Re) ranges from 3000 – 15000. Distance between two plates of wire mesh (p), ranges from 10-50 mm. The results of the experiment indicate that the Nu figure tends to be higher when there is a rise in Re and a decrease in length of p, resulting in an increase in mass of material. The increasing mass of material enables it to store a large quantity of energy from hot air causing heat to

be transferred toward the pipe wall in a higher rate. The value f tends to decline when the Re and p grow up. This phenomenon rather conforms to the general principles of nature, namely that a barrier against the flow will lead to a higher friction factor (f). The Performance Evaluation Criteria (PEC), recorded across the whole Reynolds number range, reaches a maximum where the p is 40 mm since the ratio of Nu to f is the most appropriate figure.

10. Paper ID: 30

Title: Antibacterial Properties of Silver Nanoparticles Synthesized Using Piper Letle L. Leaf Extract

Authors: Vu Tien Hieu, Bui Van Huan and Nguyen Ngoc Thang

Abstract: The green synthesis of silver nanoparticles (AgNPs) using herbal plants has gained so much attention due to their potential widespread applications, especially in biomedical application to control pathogenic microbes. The aim of our study was to evaluate the antibacterial properties of AgNPs synthesized using aqueous leaf extract of Piper betle L., an important medicinal plant. The AgNPs were identified by UV-Visible spectrometry (UV-Vis), X-ray diffraction (XRD), transmission electron microscopy (TEM) and Fourier transform infrared spectrometry (FT-IR). The presence of surface plasmon band around 420-460 nm indicated AgNPs formation. Spherical nature, unique size-distribution and crystal structure of the AgNPs with diameter around 10-20 nm were affirmed by TEM and XRD analyses. The FTIR measurements indicated the presence of bioactive compounds in the extract responsible for the efficient reduction of silver ions and stabilization of the AgNPs. The results from the antimicrobial assays suggested that the biosynthesized AgNPs were potent against pathogenic bacteria including Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus.

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