2016
Seoul, Korea
CONFERENCES ABSTRACTS
April 15-17

The 2016 International Conference on Mining, Material and Metallurgical Engineering (ICMMME 2016)

The 2016 Asia Symposium on Computational Fluid Dynamics (ASCFD 2016)

Mercure Seoul Ambassador Gangnam Sodowe

http://www.mercureseoul.com/kor/main/main.asp
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Welcome Address

We are pleased to welcome you to the 2016 Seoul conferecnes, which will takes place at **Mercure Seoul Ambassador Gangnam Sodowe** from April 15-17, 2016.

After several rounds review procedure, the program committee accepted those papers to be published in conference proceedings. We wish to express our sincere appreciation to all the individulas who have contributed to ICMMME 2016 and ASCFD 2016 conference in various ways. Special thanks are extended to our colleagues in program committee for their thorough review of all the submissions, which is vital to the success of the conference, and also to the members in the organizing committee and the volunteers who had delicated their time and efforts in planning, promoting, organizing and helping the conference. Last but not least, our speacial thanks goes to invited keynote speakers as well as all the authors for contributing their latest research to the conference.

This conference program is highlighted by four keynote speakers: Prof. Changduk Kong from Chsoun University, South Korea; Prof. Ramesh K. Agarwal, from Washington University in St. Louis, USA ; Prof. Ho-Sung Lee, Korea Aerospace Research Institute, Korea; Prof. Choi Seong Soo, from Research Center for Nanobio Science, SunMoon University, South Korea.

One best presentation will be selected from each session, evaluated from: Originality; Applicability; Technical Merit; PPT; English. The best one will be announced at the end of each Session, and awarded the certificate over the Dinner.

April is one of the best seasons in Seoul, blossosms and good wether attachts lots of people. It will be a good memory for your trip here.

We wish you a success conference and enjoyable visit in Seoul.

Alice Wu
Conference Organizing Committee

Local Information

Conference Venue

Mercure Seoul Ambassador Gangnam Sodowe---2642 Yeoksam dong Gangnam gu,135 910
Email: sm6@mercureseoul.com Tel: +822 2050 6068

Time

UTC/GMT+9

Weather

The Weather Situation of Seoul in April

Average daily minimum temperature	Average daily highest temperature
8℃	18℃

Money

Currency
Korea's currency is the won. There are 1,000; 5,000; 10,000; and 50,000 won bills. Coins come in 1, 5, 10, 100, and 500 won. (1 and 5 won coins are not widely in circulation)

Bank
Banks can offer some of the best exchange rates to travelers. Banking hours can vary, but most business hours are from 09:00 to 16:00. ATMs typically operate until 23:00, but many are open 24 hours. ATMs can also be found at convenient stores, but generally charge a higher transaction fee. ATMs that accept international cards are common, especially in areas frequented by foreigners; look for ATMs with a "Global" sign or the logo of your bank. Global ATMs offer multi-languages.

Currency Exchange
Most banks offer currency exchange services and can offer some of the best rates. Government-certified currency exchange booths also offer currency exchange services outside of regular banking hours around areas frequented by international visitors. Certified booths are marked with currency symbols with a "Certified" sign on display. It is ill-advised to exchange currency at uncertified booths.

Tipping
Tipping is not a part of Korean customs nor is it expected anywhere. However, many major hotels and upscale restaurants add a 10% service charge (on top of the 10% VAT) to the bill. Taxi drivers don't expect tips, but do appreciate if you let them keep the change.

Emergencies

In the event of an emergency, please contact the respective departments listed below.
Police Department : **Tel. 112** (for theft, assault, and other crimes)
Fire Department : **Tel. 119** (for general accidents and ambulance)
International Healthcare Center : **Tel. 1339** (medical assistance for international visitors)
Tourist Information Center: **Tel. 1330** (for any other tourism related assistance)

Instructions for Oral & Poster Presentations

Oral Presentations

- **Timing:** a maximum of 15 minutes total, including speaking time and discussion. Please make sure your presentation is well timed. Please keep in mind that the program is full and that the speaker after you would like their allocated time available to them.
- You can use CD or USB flash drive (memory stick), make sure you scanned viruses in your own computer. Each speaker is required to meet her / his session chair in the corresponding session rooms 10 minutes before the session starts and copy the slide file (PPT or PDF) to the computer.
- It is suggested that you email a copy of your presentation to your personal in box as a backup. If for some reason the files can't be accessed from your flash drive, you will be able to download them to the computer from your email.
- Please note that each session room will be equipped with a LCD projector, screen, point device, microphone, and a laptop with general presentation software such as Microsoft Power Point and Adobe Reader. Please make sure that your files are compatible and readable with our operation system by using commonly used fronts and symbols. If you plan to use your own computer, please try the connection and make sure it works before your presentation.
- Movies: If your Power Point files contain movies please make sure that they are well formatted and connected to the main files.

Poster Presentations

- Maximum poster size is 36 inches wide by 48 inches high (3ft.x4ft.)
- Posters are required to be condensed and attractive. The characters should be large enough so that they are visible from 1 meter apart.
- Please note that during your poster session, the author should stay by your poster paper to explain and discuss your paper with visiting delegates.

Dress code

- Please wearing formal clothes or national characteristics of clothing

Keynote Speeches

Prof. Changduk Kong

Chsoun University, South Korea

Prof. Changduk Kong graduated with a BSc in Aerospace Engineering from the Korea Aerospace University and a PhD in Aerospace Engineering from the Osaka Prefecture University, Japan. He worked as Head of the Aero-Propulsion Division of ADD (Agency for Defence Development in1978-1994. He has served as Professor at Department of Aerospace Engineering of Chosun University since 1994, and was appointed as Dean of the School of Aerospace and Naval Architecture Engineering in 1999 and 2005-2006, and Dean of the Facility Management Office at Chosun University in 2011-2012.

Prof. Kong has contributed greatly to the development of Aerospace Engineering in Korea, primarily through his roles as a non-standing Executive Director of KIAST(Korea Institute of Aviation Safety Technology) in 2015-2017, President of SASE(The Society for Aerospace System Engineering) in 2013-2016, President of ICRC (International Collaboration Research Centre in Natural Composites, Chosun University in 2012-2014, President of KSAS(The Korean Society for Aeronautical and Space Sciences in 2010, President of KSPE(The Korean Society of Propulsion Engineers in 2007-2008, Chair of Cycle Innovation-IGTI-ASME in 2009-2011, President of RIME(Research Institute of Mechanical Engineering-Chosun University in 2006-2008, and First Lieutenant of ROKAF(Republic of Korea Air Forces in 1974-1978.

He was Visiting Professor at Imperial College London (2001-2002) and is the Editorial Board Members of IJTJ(International Journal of Turbo & Jet Engines), IJCM(International Journal of Composite Materials), CJS(Chinese Journal of Aeronautics) and AEAT(Aircraft Engineering and Aerospace Technology), and Editor-in-Chief of JKSAS(Journal of Korean Society for Aeronautical and Space Science) and JKSPE(Journal of Korean Society of Propulsion Engineers)(2006-2010). He received the Korean National Decoration in Science for his scientific achievement and contribution to Korean aerospace development, Academic Achievement Awards from KSAS, SASE and KSPE and the 2015 KAI-KSAS Prize.

Prof. Kong has authored and co-authored more than 610 papers including 65 SCI journal papers, and has received numerous lecture invitations from companies, research institutes and universities and delivered seven keynotes and invited lectures at international conferences. He has organized 24 national conferences, forums and workshops and was co-organiser on four international conferences.

"Design and Manufacturing of Natural Fiber Composites Chemical Container Using Resin Flow Simulation of VARTML Process"

Abstract: Recently, studies on eco-friendly fiber obtained from nature have been actively conducted to the area of composite due to increasing interest in eco-friendly materials. Although the natural fiber has less strength than the high strength fiber such as the carbon fiber, it has similar strength to glass fiber. Accordingly, it can be applied as very advantageous composite when an appropriate resin has been selected. For the purpose of applying eco-friendly material of aircraft doors or interiors, this study evaluates mechanical properties of natural fiber composites. The mechanical properties of several natural fibers are reviewed and compared to select a proper nature fiber for the target study structure. After reviewing several kinds of natural fibers, several resins to be applied to the selected natural fiber are reviewed through comparison of mechanical properties including strength, interaction with fiber, cost, etc. Finally the flax is selected as a natural fiber due to higher strength and better mechanical behaviors than other natural fibers, and the vinyl ester is selected as a resin due to lower cost, easier procurement and better treatment for the resin injection. For easy and fast production of the complicated configuration structure, the vacuum assisted resin transfer molding(VARTM) manufacturing method is selected. The flax/vinyl ester composite specimens are manufactured and tested to find the mechanical properties. Based on this, structural design of chemical storage container for agricultural vehicle was performed using flax/vinyl ester. After structural design and analysis, the resin flow analysis of VARTM manufacturing method was performed.

Prof. Ramesh K. Agarwal

Washington University in St. Louis, USA

Professor Ramesh K. Agarwal is the William Palm Professor of Engineering in the department of Mechanical Engineering and Materials Science at Washington University in St. Louis. From 1994 to 2001, he was the Sam Bloomfield Distinguished Professor and Executive Director of the National Institute for Aviation Research at Wichita State University in Kansas. From 1978 to 1994, he was the Program Director and McDonnell Douglas Fellow at McDonnell Douglas Research Laboratories in St. Louis. Dr. Agarwal received Ph.D in Aeronautical Sciences from Stanford University in 1975, M.S. in Aeronautical Engineering from the University of Minnesota in 1969 and B.S. in Mechanical Engineering from Indian Institute of Technology, Kharagpur, India in 1968. Over a period of forty years, Professor Agarwal has worked in various areas of Computational Science and Engineering - Computational Fluid Dynamics (CFD), Computational Materials Science and Manufacturing, Computational Electromagnetics (CEM), Neuro-Computing, Control Theory and Systems, and Multidisciplinary Design and Optimization. He is the author and coauthor of over 500 journal and refereed conference publications. He has given many plenary, keynote and invited lectures at various national and international conferences worldwide in over fifty countries. Professor Agarwal continues to serve on many academic, government, and industrial advisory committees. Dr. Agarwal is a Fellow eighteen societies including the Institute of Electrical and Electronics Engineers (IEEE), American Association for Advancement of Science (AAAS), American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), American Society of Mechanical Engineers (ASME), Royal Aeronautical Society, Chinese Society of Aeronautics and Astronautics (CSAA), Society of Manufacturing Engineers (SME) and American Society for Engineering Education (ASEE). He has received many prestigious honors and national/international awards from various professional societies and organizations for his research contributions.

"CFD Simulations of Transport of Atmospheric Aerosols and Nanoparticles in Models of Human Respiratory System"

Abstract:Numerical simulations of transport of atmospheric aerosols and nanoparticles in models of various parts of human respiratory system are performed using the Navier-Stokes equations in continuum regime and slip/transitional flow regime. Although the primary interest of this investigation is the study and understanding of aerosol transport in human respiratory system, the computational modeling and analysis of the entire system is currently not feasible because of extreme complexity of airflow in the nasal cavities, oral and bronchial airways of the respiratory system. Because of geometric complexity of pathways, the flow field features include turbulent jet-like flow, recirculating flow, secondary flow (Dean's

flow), vortical flows, large pressure drops etc. Such complex flows generated in nasal cavities and oral airways eventually propagate into the tracheobronchial airways. In order to make the problem tractable, simple rigid models of nasal cavities, oral and bronchial airways are considered; fluid/structure interactions are neglected. CFD modeling results show that essential features of the flow fields in these passages can be captured; however the proper formulation and implementation of boundary conditions is critical in obtaining accurate solutions. We assume that aerosols are spherical, non-interacting and mono-disperse, and deposit upon contact with the airway surface. These dilute particle suspensions are modeled with the Euler-Lagrange approach for micron size particles and in the Euler-Euler framework for nanoparticles. The results show that micron size particles deposit non-uniformly with high concentrations while the nanoparticles almost coat the airway surfaces. Although preliminary, these simulation studies have implications in assessing the detrimental health effects in the case of inhaled toxic nanoparticles. The variations in several parameters employed in the models such as the geometric features (which can be individual-specific), the inhaling/exhaling patterns, particle distributions (from micron to nanoscale), boundary conditions etc. can significantly affect the particle deposition in the respiratory system pathways.

Plenary Speeches

Prof. Ho-Sung Lee

Korea Aerospace Research Institute, Korea

Dr. Ho-Sung Lee is a professor at University of Science and Technology and at the same time a principal researcher at Korea Aerospace Research Institute. He attended University of North Carolina at Chapel Hill and University of California-Davis, where in 1990 he received his Doctor's degree in Materials Science. Since then, he has been a principal researcher at KARI, Korea Aerospace Research Institute, which is a government research institute. He is actively working on aerospace materials and manufacturing for space launcher and spacecraft.

"Materials and Manufacturing Technology for Aerospace Application"

ABSTRACT: This presentation gives an overview of current work in materials and manufacturing technology for aerospace application. Materials technologies are critical for aircraft and spacecraft and the aerospace system requires improved performance for materials and structures. Although enhanced performance continues to be a high priority, it must be achieved with affordable technologies depending on the mission of the aerospace system. It is also important to consider affordability in terms of the overall life cycle of the system. Finding the best material to use for a particular application is not simple and it depends on many factors including mission requirements like performance and safety, design requirements like strength to density ratio and operating temperature, and material technology prospects like current state of materials/processes technologies. Materials with high specific strength (strength per unit of weight) have long been popular with the aerospace industry, as aerospace vehicle made from such materials provide the required strength with less weight, thereby increasing payload and reducing operating cost. Typical examples are polymer matrix composite and aluminum-lithium alloys for aerospace structures. In liquid rocket propulsion systems, improved high-temperature capability offers the greatest performance payoff, with improved mechanical strength and lower weight also being important. For spacecraft, materials with improved resistance to radiation and atomic oxygen are required. Since before a material can be used in an aerospace system, it must be qualified for use, materials qualification procedure is also presented with an example of shared data.

Prof. Choi Seong Soo

Research Center for Nanobio Science, SunMoon University, South Korea

"Towards Plasmonic Optical Nanopore Fabrication for Single Molecule Analysis"

ABSTRACT: Recently there have been tremendous interests about the single molecule analysis by using the plasmonic optical nanopore. Presently the solid state nanopore with an electrical detection technique using a SiN membrane and a monolayer grapheme have been fabricated. However, there have been many problems such as fabrication processing and detection difficulties, which could originate from nanometer thin layer and electrical double inside nanopore. We present the fabrication of a nanopore with an Au-C membrane, which can provide the plasmonic hot spot effect. Initially the nano-apertures on the were drilled with 30 keV Ga ion focused ion beam technique. Then, the diffused membrane was formed by irradiating the electron beam scanning or Ga ion beam scanning. We found the diffused membrane contains Au and C atoms. Then, several months later, the Au clusters of (2~ 6) nm size are formed due to Ostwald ripening process. In addition, drilling an Au nano membrane with its diameter less than 5 nm by using 200 keV electron beam can be achieved. Evaporation of Au atoms induced by electron- beam thermal spike may explain the drilling phenomenon. The Au nanopore formed either by diffusion or drilling can be utilized for next generation nanopore bio-sensor technology.

Daily Schedule of Events

April 15th| Friday	Registration (Lobby): Renne Gao Note *Collecting conference materials *Delegates will get the certificate at the registration desk. *The organizer won't provide accommodation, and we suggest you make an early reservation.	10:00am-17:00pm
April 6th	Saturday	Morning	Registration (Lobby)	9:00am-17:00pm
		Mercury Hall	
		Opening Remarks: Prof. Ramesh K. Agarwal Washington University in St. Louis, USA	9:00am-9:05am
		Keynote Speech I: Prof. Changduk Kong Chsoun University, South Korea	9:05am-09:50am
		Keynote Speech II: Prof. Ramesh K. Agarwal Washington University in St. Louis, USA	09:50am-10:35am
		Coffee Break & Group Photo	10:35am-10:55am
		Plenary Speech I: Prof. Ho-Sung Lee Korea Aerospace Research Institute, Korea	10:55am-11:30am
		Plenary Speech II: Prof. Choi Seong Soo Research Center for Nanobio Science, SunMoon University, South Korea	11:30am-12:05pm
April 16th	Saturday	Afternoon	*Lunch - Restaurant*	12:05pm-13:30pm
		Mercury Hall	
		Session 1: Mechanical engineering	13:30pm-14:45pm
		COFFEE BREAK	14:45pm-15:15pm
		Session 2: Material properties and engineering applications	15:15pm-17:30pm
		Poster Session	13:30pm-17:30pm
		Dinner—City Cafe	18:00pm-19:00pm
17th		One day tour (Consult on site)	

Note: Copy PPT/PDF on conference laptop 10 mins earlier before each session

Technical Program

Morning, April 16th, 2016

Opening & Keynote Speeches

Chair: Prof. Ramesh K. Agarwal, Washington University in St. Louis, USA
Time: 9:00am-11:55pm

9:00am-9:05am Opening Remarks	***Diamond Room A, 5/F***	**Prof. Ramesh K. Agarwal** Washington University in St. Louis, USA
9:05am-09:50am Keynote Speech I		**Prof. Changduk Kong** Chsoun University, South Korea "Design and Manufacturing of Natural Fiber Composites Chemical Container Using Resin Flow Simulation of VARTML Process"
9:50am-10:35am Keynote Speech II		**Prof. Ramesh K. Agarwal** Washington University in St. Louis, USA "CFD Simulations of Transport of Atmospheric Aerosols and Nanoparticles in Models of Human Respiratory System"
10:35am-10:55am		Coffee Break & Group Photo
10:55am-11:30am Plenary Speech I		**Prof. Ho-Sung Lee** Korea Aerospace Research Institute, Korea "Materials and Manufacturing Technology for Aerospace Application"
11:30am-12:05pm Plenary Speech II		**Prof. Choi Seong Soo** Research Center for Nanobio Science, SunMoon University, South Korea "Towards Plasmonic Optical Nanopore Fabrication for Single Molecule Analysis"
12:05pm-13:30pm	Lunch Time	

*The Group Photo will be updated online.

**One best presentation will be selected from each session, the best one will be announced at the end of each session and awarded certificate during the dinner, the winners' photos will be updated online.

***Best Presentation will be evaluated from: Originality; Applicability; Technical Merit; PPT; English.

****Please arrive at the conference room 10 minutes earlier before the session starts, copy your PPT to the laptop.

Afternoon, April 16th , 2016

Session-1< Mechanical engineering>

Venue: Mercury Hall
Chair:
Time: 13:30pm-14:45pm

Note:
* The certification of Oral/Poster presentations, listeners, will be awarded at the end of each session.
* For the Best Presentation of each session, it is encouraged to award it to student author prior.
*To show the respect to other authors, especially to encourage the student authors, we strongly suggest you attend the whole session, the scheduled time for presentations might be changed due to unexpected situations, please come as early as you could.
* session photo will be taken at the end of the session and update online

D001:

Time: 13:30-13:45

Numerical simulation of combustion chamber for button turbojet engine

Dr. Hongpeng Ma, Shuzhou Fang, Hang Gao, Teng Li and Guanlin Fang
Beijing Institute of Technology, China

To provide reference data for ultra-micro combustor, a new type button turbojet engine was designed and simulated the combustion's steady-state process. The boundary condition of inlet was calculated using isentropic numerical calculation, taken into turbulent chemical reaction, heat radiation, and so on, getting the combustion chamber's steady-state of the velocity, temperature and component concentration distribution, analysis the fuel/air flow and backflow, combustion efficiency and total pressure recovery coefficient, and compared with the experimental data. The calculation results can accurately reflect the actual combustion. The results show that combustion chamber exit velocity is about 65m/s, outlet temperature is around 1000K, the simulation and experimental data are similar, combustion chamber structure design is reasonable, and this paper will provide a basis for the future improvement of the millimeter scale turbojet engine.

D002-A:

Time: 13:45-14:00

A Numerical Analysis on the Flow Characteristics in the Small Axial Piston Pump

Ms. Jonghyuk Yoon, Jong-Il Yoon, Seong-Gyo Chung and Sam-Seok Choi
Korea Construction Equipment Technology Institute, Korea

This work fits into the context of the interpretation of automatic gestures based on computer vision. The aim of our work is to transform a conventional screen in a surface that allows the user to use his hands as pointing devices. These can be summarized in three main steps. Hand detection in a video, monitoring detected hands and conversion paths made by the hands to computer commands. To realize this application, it is necessary to detect the hand to follow. A classification phase is essential, at the control part. For this reason, we resorted to the use of a neuro-fuzzy classifier for classification and a pattern matching method for detection.

D003:

Time:14:00-14:15

A numerical method based on the range-discrete grid for one-dimensional Buckley-Leverett equation

Mr. Zhiwei Cao, Zhifeng Liu and Xiaohong Wang
University of Science and Technology of China, China

A numerical method for solving the one-dimensional Buckley-Leverett equation arising in the process of displacement of oil by water is presented. Instead of using the traditional spatial discrete grids, the numerical algorithm is built on a “range discrete” grid, which is obtained by direct subdivisions in the saturation domain. The range discrete grid describes the discontinuities explicitly and completely, and has an adaptive nature in smooth regions. Grid points are divided into two classes: continuous points and discontinuous points. Numerical solution of the Buckley-Leverett equation is achieved by moving continuous points by tracing characteristics and moving discontinuous points by tracking discontinuities. Numerical examples are presented, and the solutions obtained by the proposed method are found of high precision. Especially, shocks are solved with no dissipation, and the sharpness is maintained.

D007

Time:14:15-14:30

Aeroacoustic Simulation for NASA CC3 Centrifugal Compressor Operating at off Design Condition

Dr. Mohamed Alqaradawi, Ibrahim Shahin, Mohamed Gadala and Osama Badr
Collage of Engineering, Qatar University, Doha (2713), Qatar

This paper covers the characterization of the acoustic noise and the unsteady flow field of a high speed centrifugal compressor NASA CC3. In order to accurately predict the noise, all analyses are carried out through the use of Large Eddy Simulation and Ffowcs Williams–Hawkings model for noise prediction. The relative effect of hub cavity on flow characteristics and sound levels is investigated, for a compressor stage with a total pressure ratio equal to 4, working from surge to near choke condition. In comparison with the experimental results from literature, the predicted compressor performance and flow field are predicted well. The hub cavity flow effect on the compressor aeroacoustic generated noise is shown in the paper. The unsteady static pressure and sound pressure levels are compared not only at different location but also for design and off design operating points. The internal flow results inside the hub cavity are presented at surge, design and near choke points. The conclusion is that the cav**ity eff**ect of the centrifugal compressor cannot be ignored in the numerical prediction of aerodynamic generated noise. The impeller back plate of the rotor experiences a strong pressure fluctuation, which is maxima at the impeller outer radius for all operating point, but higher pressure values at the surge point.

E002

Time:14:30-14:45

Advanced manufacturing process, Finite element analysis,

Somsak Limwongsakorn, **Dr. Wasawat Nakkiew**, Adirek Baisukhan
Chiang Mai University, Thailand

The proposed finite element analysis (FEA) model was constructed using FEA simulation software, ANSYS program, for determining effects of corrosion fatigue (CF) from TIG welding process on AISI 304 stainless steel workpiece. The FEA model of TIG welding process was developed from Goldak's double ellipsoid moving heat source. In this paper, the residual stress results obtained from the FEA model were consistent with results from the X-ray diffraction (XRD) method. The residual stress was further used as an input in the next step of corrosion fatigue analysis. The predictive CF life result obtained from the FEA CF model were consistent with the value obtained from stress-life curve (S-N curve) from the reference literaturature. Therefore, the proposed FEA of CF model was then used for predicting the corrosion fatigue life on TIG welding workpiece, the results from the model showed the corrosion fatigue life of 1,794 cycles with testing condition of the frequency (f) = 0.1 Hz and the equivalent load of 67.5 kN (equal to 150 MPa) with R = 0.25.

Session-2 < Material properties and engineering applications>

Venue: ***Mercury Hall***
Chair:

Time: 15:15pm-17:30pm

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* session photo will be taken at the end of the session and update online

E004:

Time:15:15-15:30

SLOW RELEASE OF UREA ENCAPSULATED BY STARCH PVA MATRIX

Mr. LUM YIP HING, AZIZAH SHAABAN, NORAIHAM MOHAMAD, FAIRUZ DIMIN
UNIVERSITI TEKNIKAL MALAYSIA MELAKA, MALAYSIA

The hydrophobicity of starch/PVA blend was improved by crosslinking with boric acid. It was found that the swelling ratio of the boric acid modified starch/PVA matrix decreased as function of boric acid concentration. FTIR spectra and SEM images demonstrated that the urea had been encapsulated in polymer matrix successfully. The urea release characteristic was explained with respect to the swelling ratio and crosslinking density of polymer matrix. In addition, the matrix displayed a good barrier for controlling the release rate of urea from pellet.

E006-A:

Time:15:30-15:45

Investigation the Effect of the Stabilizer for the Electroless Nickel – Boron Plating

Mr. Rasid Ahmed Yildiz, Kenan Genel and Turgut Gulmez
Istanbul Technical University, Turkey

The present work aims to study the effect of stabilizer added electroless plating baths for Nickel – Boron coating. Electroless nickel plating which is an auto-catalytic chemical technique has a wide range of usage area by virtue of high corrosion resistance and high wear resistance. Zn – Mg – Cu alloyed 7075 aluminum alloy was used as a substrate as well as structural materials in aeronautical industries. Three different electroless plating baths were prepared in order to deposit Ni – B coating on 7075 Al alloy. Nickel chloride is used as the source of nickel ions and sodium borohydride as the reducing agent for boron. The plating bath provides highest deposition rate was obtained and appropriate electroless plating temperature was investigated. The effect of thallium nitrate, lead nitrate and lead tungstate on the formation of electroless Ni-B and Ni-W-B deposits obtained from an alkaline sodium borohydride reduced electroless bath is addressed in this paper. Plating rate is determined as a function of stabilizers. On behalf of deposition of tungstate in electroless Ni-B coating, sodium tungstate was added. The amount of added sodium tungstate to the electroless alkaline bath had a siginificant influence on the deposition rate. Coating on the aluminum alloys required zincating process. After zincating process, plating the Ni-B and Ni-W-B on 7075 Al alloy have been executed. Moreover, the characteristics of the deposition of electroless Ni-B and Ni-W-B were investigated by means of X-ray diffraction, SEM and EDS analyses. Addition of stabilizer to the electroless Ni-B solution resulted in the formation of phases with the stabilizer which is revealed by XRD analyses. It is observed that the stabilizer itself and amount of stabilizer is related the deposition rate of plating.

E007:

Time:15:45-16:00

The Effect of Ag3PO4 in WO3 Electrochromic Film

Ms. Preyada Tatsanabenjakul, Lek Sikong and Kanadit Chetpattananondh
Prince of Songkla University, Thailand

WO_3/Ag_3PO_4 electrochromic films were prepared by sol-gel and dip coating methods. The synthesized films were smooth having amorphous structure. The 0.8 wt% Ag_3PO_4-doped WO_3 films displayed best electrochemical properties and optical modulation due to the effect of Ag_3PO_4 on reduction of band gap energy and enhancement of electrons and ions diffusions. X-ray photo-electron spectroscopy (XPS) was used to confirm the presence of Ag^+ from Ag_3PO_4 in WO_3/Ag_3PO_4 electrochromic films. They exhibited reversible electrochromic property with fast switching time when compared to that of pure WO_3 film.

E011:

Time:16:0-16:15

Electrical and Mechanical Properties of Surface Functionalized Carbon Nanotubes Incorporated Graphite-Phenolic Composite Bipolar Plate for PEMFC

Ms. Pattarakamon Chaiwan, Thapanee Sarakonsri, Jantrawan Pumchusak
Chiang Mai University,Thailand.

This research aims to study the effect of the functionalization of the multiwall carbon nanotubes (MWCNTs) on the mechanical property improvement of phenolic composites for bipolar plate applications in proton exchange membrane fuel cells (PEMFC). The MWCNTs were oxidized by strong acid and silanized by silane coupling agent in order to enhance the interfacial adhesion between the MWCNTs and matrix and were used as reinforcement in the phenolic composites. The silanized MWCNTs was found to improve the mechanical properties of the composites; however, they caused the decrease of electrical conductivity due to the wrapping of the MWCNTs with non-conductive silane molecules. Nevertheless, the conductivity of more than 100 S/cm is maintained to meet the DOE requirement of materials for use as bipolar plates.

E012:

Time:16:15-16:30

Improvement of Thermal and Ablative Properties of Phenolic Resin by SiC and MMT

Ms. Keeratikarn Kuttiwong and Jantrawan Pumchusak
Chiang Mai University,Thailand

In this work, the improvement of thermal and ablative properties of the phenolic resin by the addition of silicon carbide (SiC) and montmorillonite (MMT) were studied. The phenolic composites were fabricated by hot compression. The thermal stabilities, mechanical properties and ablative properties of the neat phenolic resin and the SiC/MMT phenolic composites were examined using a Lloyd universal testing machine, thermogravimetric analysis (TGA) and ablation tests (an oxyacetylene torch), respectively. Mass ablation rates were measured after flame exposure. The results showed that SiC/MMT provided the higher thermal stabilities and lower ablation rates to the phenolic resin.

E013:

Time:16:30-16:45

Thermal and Mechanical Properties of PLA/BN/BR Ternary Composite Films

Ms. Arper Baethu and Jantrawan Pumchusak
Chiang Mai University,Thailand

In this research, the effects of boron nitride (BN) and polybutadiene (BR) on thermal and mechanical properties of polylactic acid (PLA) composite films were studied. PLA thin film in the thickness of less than 0.2 mm was fabricated using the solvent casting method. The loadings of BN and BR of 0-7 wt% were applied to the PLA matrix. The morphologies of composite films were characterized by scanning electron microscopy (SEM). The thermal and mechanical properties were also investigated. It was found that the addition of BN and BR can improve the thermal properties of PLA composite films. PLA/BN3%/BR5% ternary composite films provided the higher thermal properties, tensile strength and Young's modulus, compared to PLA/BN1%/BR5% ternary composite films.

E2002-A:

Time:16:45-17:00

Effect of Lime on Fe-Ni-Cr Crude Alloy Production

Prof. Yape, Erlinda O. & Anacleto, Nathaniel M.
Mindanao State University, Philippines

Ferronickel and ferrochromium, obtained from the reduction of laterite and chromite ores, respectively , are two important raw materials in the production of stainless steel. These alloys are normally reduced in the presence of fluxes. The catalytic effect of lime on the Fe-Ni-Cr crude alloy production from direct smelting of chromite and laterite ores with carbon as reducing agent was investigated in a vertical tube furnace at 1450^{o}C to 1550^{o}C under argon atmosphere. The present study was undertaken to determine the effect of lime on the recovery of nickel,, chromium, and iron in the metal phase and in the slag phase of the smelting process.
It was found that the presence of 10 wt% lime as fluxing agent have different effects on the different components in the separated metal alloy. For chromium, the presence of lime is significant as it produced higher Cr concentration, not very significant for nickel, and significant for iron at the early stage of reduction.

E2006:

Time:17:00-17:15

Effect of Calcination Temperature and Time on Waste Heterogeneous Catalysts for Biodiesel Production

Dr. Sarina Sulaiman and Siti Rohana
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, MALAYSIA

This paper studies the effect of calcination time and temperature of mixed waste catalyst for optimization of FAME yield. Fish bone and mixture of coconut waste and eggshells were used to catalyzed the transesterification process. The parameter was tested on different calcination condition and the result shows that the optimum condition was achieved at condition 800˚C, 2 hours was 80.3 wt% of FAME yield for mixed coconut waste and eggshells and 85 wt% were obtained at 900˚C for fish bone catalyst at 225 rpm, 12:1 methanol to oil ratio and amount of catalyst, 3wt%. It can be concluded that waste heterogeneous catalyst exhibits as a cheaper substitute to the homogenous catalyst.

E2012:

Time:17:15-17:30

Measuring Dilution of Laser Cladding of Stellite 6 on a Nickel Superalloy Substrate with Two Different Laser Power Inputs

Alain Kusmoko and Huijun Li
Faculty Engineering,University of Wollongong, Australia

Stellite 6 was deposited by laser cladding onto a nickel superalloy substrate (NIS) with laser powers of 1 kW (NIS 1) and 1.8 kW (NIS 1.8). The chemical compositions and microstructures of these coatings were characterized by atomic absorption spectroscopy, optical microscopy, and scanning electron microscopy. The microhardness of the coatings was measured and the wear mechanism of the coatings was examined using a pin-on-plate (reciprocating) wear testing machine. The results showed less cracking and pore development with Stellite 6 coatings applied to the nickel superalloy substrate at a lower laser power (NIS 1), while NIS 1 was much harder than that obtained for NIS 1.8. The results of the wear test showed that the weight loss for NIS 1 was much lower than NIS 1.8. The measurements of dilution and estimation of the C content indicated that dilution for NIS 1 was less than for NIS 1.8 while the C content for NIS 1.8 was less than NIS 1. It was concluded that the lower hardness of the coating for NIS 1.8 was due to a higher level of dilution and lower concentration of C, which markedly reduced the wear resistance of the Stellite 6 coating.

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