2016

CONFERENCE ABSTRACT

May 14-16, 2016
Chiang Mai, Thailand

Supported by Chiang Mai University, Thailand

Venue: University Academic Service Center
--Green Nimman CMU Residence
Chiang Mai University (UNISERV CMU)
239 Nimmanhemin Road, Mung Chiang Mai, 50200,Thailand Tel.(66 53) 942881-4 Fax.(66 53) 942890

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Welcome Letter

Dear Colleagues

2016 7th International Conference on Material and Manufacturing Technology (ICMMT 2016) will be held in Chiang Mai, Thailand during May 14-16, 2016.

Workshops: 2016 International Conference on Computer and Digital Manufacturing and International Conference on Reliability Engineering

This conference is supported by Chiang Mai University, Thailand and organized by American Society for Research (ASR)

The event has the objective of creating an international forum for academics, researchers and scientists from worldwide to discuss worldwide results and proposals regarding to the soundest issues related to Material and Manufacturing Technology.

This event will include the participation of renowned keynote speakers, oral presentations, posters sessions and technical conferences related to the topics dealt with in the Program as well as an attractive social and cultural program.

The Conference will also have a space for companies and/or institutions to present their products, services, innovations and research results. If you or your company are interested in participating of this exhibition, please contact the Technical Secretariat here.

Finally, on behalf of the Organizing Committee, I would like to invite all the Scientific Community to participate in this project, presenting papers or communications related to any of the proposed areas.

Welcome to Chiang Mai !

Conference Chair

Assoc. Prof. Wassanai Wattanutchariya,
Chiang Mai University, Thailand

Instructions for Oral Workshop

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

*One best presentation will be selected from each session, the best one will be announced and award the certificate at the end of each session.

Devices Provided by the Conference Organizer:

- **Laptops (with MS-Office & Adobe Reader)**
- **Projectors & Screen**
- **Laser Sticks**

Materials Provided by the Presenters:

- **PowerPoint or PDF files (USB flash disk Or CD)**
- **Poster Presentation: A1 Size**

Please copy your slide file to the desktop before the session starts
During your poster session, the author should stay by your poster paper to explain and discuss your paper within visiting

Duration of Each Presentation:

- **Regular Oral Session: about 15 Minutes of Presentation including Q&A.**
- **Keynote Speech: 45 Minutes of Presentation including Q&A.**

About Dress Code

- **All participants are required to dress formally. Casual wear is unacceptable.**
- **National formal dress is acceptable.**

Keynote Speeches

Speech Title
Metal Oxide Nanocomposites: Advantages and Shortcomings for Application in Conductometric Gas Sensors

Abstract: The features of conductometric gas sensors based on metal oxide composites are considered. The methods of the composites forming and the advantages of their using in the development of gas sensors are discussed. It is given the analysis of the factors that reduce the effectiveness of the composites using in conductometric gas sensors, which should be taken into account while designing and fabricating sensors based on metal oxide composites. The mechanisms explaining the operation of conductometric gas sensors based on metal oxide composites are also discussed.

Prof. Ghenadii Korotcenkov
Gwangju Institute of Science and Technology, Korea

Ghenadii Korotcenkov received his PhD in Physics and Technology of Semiconductor Materials and Devices from Technical University of Moldova in 1976 and his Dr. Sci. degree in Physics of Semiconductors and Dielectrics from Academy of Science of Moldova in 1990 (Highest Qualification Committee of the USSR, Moscow). He has more than 40-year experience as a teacher and scientific researcher. Long time he was a leader of gas sensor group and manager of various national and international scientific and engineering projects carried out in the Laboratory of Micro- and Optoelectronics, Technical University of Moldova. In particular, his scientific team was involved in eight international projects financed by EC (INCO-Copernicus and INTAS Programs), USA (CRDF, CRDF-MRDA Programs) and NATO (LG Program). 2007-2008 years he was an invited scientist in Korea Institute of Energy Research (Daejeon). Currently starting from 2008 year Dr. G. Korotcenkov is a research professor of the School of Materials Science and Engineering at Gwangju Institute of Science and Technology (GIST) in Korea.

Specialists from Former Soviet Union know G. Korotcenkov's research results in the field of study of Schottky barriers, MOS structures, native oxides, and photoreceivers on the base of III-Vs compounds. His present scientific interests starting from 1995 year include material sciences, focusing on metal oxide film deposition and characterization, surface science, and thin film gas sensor design. G. Korotcenkov is the author or editor of thirty five books and special issues, including 11 volume "Chemical Sensors" series published by Momentum Press (USA), 15 volume "Chemical Sensors" series published by Harbin Institute of Technology Press (China), 3 volume "Porous Silicon: From Formation to Application" series published by CRC Press (USA) and 2 volume "Handbook of Gas Sensor Materials" published by Springer (USA). He published nineteen review papers, thirty book chapters, and more than 200 peer-reviewed articles (h-factor=34 (Scopus) and h=38 (Google scholar citation)). He is a holder of 18 patents. He presented more than 200 reports on the National and International conferences. G. Korotcenkov was co-organizer of several conferences. His research activities are honored by Award of the Supreme Council of Science and Advanced Technology of the Republic of Moldova (2004), The Prize of the Presidents of Ukrainian, Belarus and Moldovan Academies of Sciences (2003), Senior Research Excellence Award of Technical University of Moldova (2001; 2003; 2005), Fellowship from International Research Exchange Board (1998), National Youth Prize of the Republic of Moldova (1980), among others.

Keynote Speeches

Speech Title
Fabrication and Characterization of Scaffolds for Tissue Engineering

Abstract: Tissue engineering is an interdisciplinary field that applies the principles of engineering and the life sciences to develop biological substitutes that restore, maintain, or improve tissue function. In tissue engineering, the scaffold serves as a surface for cell adhesion, a structure to regulate organ formation, and as the object of implantation. Biomaterials such as hydroxyapatite (HA), fibroin, and chitosan are acceptable materials for biological scaffold fabrication and can be synthesized from the natural sources such as bovine bone, mollusk shell, silk cocoon, or squid pen. However, each material has its limitations. Therefore, materials are mixed at varying ratios to mitigate the limitations and improve properties relevant to the application. In the meantime, several techniques are employed to produce scaffolds, including freeze-drying, slip casting, solid freeform fabrication, and molding. Each technique also has its advantages and drawbacks. Thus, characterization needs to be performed to evaluate the effects of both material type and fabrication factors on the properties of the scaffold in order to develop suitable scaffolds for tissue engineering.

Assoc. Prof. Wassanai Wattanutchariya,
Chiang Mai University, Thailand

Wassanai Wattanutchariya is an Associate Professor in Industrial Engineering, Department of Industrial Engineering, Faculty of Engineering, Chiang Mai University. He received a Ph.D. from Department of Industrial and Manufacturing, School of Engineering, Oregon State University in 2002. He has experience in Fabrication Technology for Energy, Chemical, and Biological Systems, as well as the Development of Biomaterials and Biomedical Devices. His teaching and research interests include Precision Engineering and Modern Manufacturing, along with Product Design and Process Development.

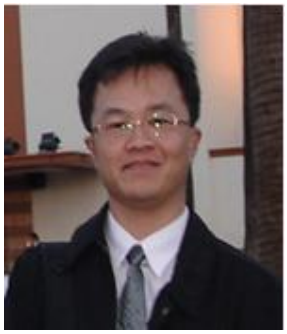
His research projects have been funded by many Thai funding agencies including the National Research Council of Thailand, the Thailand Research Fund, and the Agricultural Research Development Agency (Public Organization). Examples of his research projects include the fabrication of fuel cell equipment, the product or process improvement for agricultural products, as well as the development of natural based biomaterial for medical application.

A recent research project on the “Development of Bone Substitute from Local Materials” was honoured with the 2015 Inventor Award by the National Research Council of Thailand. This was a collaboration between his engineering team and medical doctors from the Faculty of Medicine.

Keynote Speeches

Speech Title:
Reliability Modeling and Decision Analysis in Repairable Systems

Abstract: Repairable systems, such as power or mechanical systems, usually have the phenomena of aging, since such systems can be restored to fully implement the required functions by methods other than replacing the entire system, usually, the successive failure times can become smaller and smaller. If aging is detected, then the decision of when to overhaul or discard the system is of fundamental importance. However, experts' opinions about the degree of aging and the initial status of the system, which are usually the absence of sharply defined criteria, are critical for decision making. This speech develops an advanced Bayesian decision process to deal with such situations and provide guidelines for decision making in aging repairable systems.



Assoc. Prof. Chi-Chang Chang,
Chung-Shan Medical University, Taiwan

Dr. Chi-Chang Chang is currently an associate professor of Medical Informatics in the Chung Shan Medical University's College of Health Care and Management, and a consultant on Biomedical Industry Research Center & Medical Information Center, Chung-Shan Medical University Hospital. Dr. Chang received the master's degree in Information Management from the Ming-Chuan University, the Ph.D. degree in Industry Engineering Management from the Yuan-Ze University. He is also academic member of the Association for Information Systems and Society for Medical Decision Making. His primary research interests are in the areas of medical decision analysis, reliability engineering, stochastic processes, shared medical decision making, and clinical operational research. He has published in European Journal of Operational Research, Medical Decision Making, Journal of Medical Systems, Neural Computing and Applications, European Psychiatry, Journal of Universal Computer Science, International Journal of Technology Management, Central European Journal of Medicine, etc. To date, he has published more than 100 articles in the forms of journals, book chapters and conference proceedings.

Invited Speeches

Speech Title:
Proposal and Developments of “Plasma fusion CMP” Systems combining CMP (Chemical Mechanical Polising) and P-CVM (Plasma Chemical Vaporization Machining) for Hard-to-process Materials

Abstract: Currently, wide gap semiconductors such as silicon carbide (SiC), gallium nitride (GaN) and single crystalline diamond have attracted attention as a green device, and various research and development are being undertaken.
However, processing of SiC, GaN and diamond single crystal substrates are extremely difficult because these substrates have high hardness and high resistance to chemical reaction. Therefore, huge amount of time and cost will be required if conventional chemical mechanical polishing (CMP) is applied to final process of single crystalline diamond substrate. An innovative planarization system named “plasma fusion CMP” was developed for aiming to establish a high efficiency and high quality polishing process of the hard to process materials.
In this study, we propose a novel ultra-precision machining process of hard-to-process materials used as a substrate for green devices including SiC, GaN and diamond as an "ultimate" semiconductor substrate. The fundamental approach is to divide the process into two steps, a pre-treatment step and a finishing step.
The pre-treatment step attempts to form pseudo-radical sites in the substrate so that the surface is more readily processed and finished. In the finishing step, we not only conduct flattening process using ultra-precision polishing/CMP with an assistance of continuously formed pseudo-radical sites (in-situ forming of pseudo-radical sites and flattening process) but also introduces a processing method combining a stress-free (damage-free) P-CVM (Plasma-Chemical Vaporization Machining) utilizing high-efficiency plasma etching. It is worth noting that the combination of CMP and P-CVM is not a simple addition. Rather, our goal is to attain an innovative fusion processing technology through a synergistic effect of these two processes.

Toshiro K. Doi,
KYUSHU UNIVERSITY, Japan

Dr. Toshiro Karaki Doi is currently a Professor in the Art, Science & Technology Center (KASTEC) at Kyushu University, Japan. After graduating from Yamanashi University, Dept. of Engineering in 1971, and finishing his graduate study on precision engineering in 1973, he joined Nippon Telegraph and Telephone Public Corporation (NTT) in the same year. He earned his PhD in the Polishing Technology from the University of Tokyo in 1985. He left NTT in 1988 and joined Saitama University. While in Saitama University, he acted as visiting professor at the University of Arizona in USA from 2003 to 2005.
He left Saitama University in 2007 to work in Kyushu University. He is currently a professor emeritus of Kyushu University as well as of Saitama University, and actively engaged in the research and development of Ultra-precision process of crystal materials for realization of green device society as Project Leader & Professor in KASTEC, Kyushu University. His research covers precision processing including CMP technology for the functional materials. He has published several books and more than 300 papers in Japan and abroad. He is the inventor or co-inventor of more than 190 patents. He has been awarded academic prizes more than 12 times. He was awarded the “Japan Society for Precision Engineering prize” from JSPE, recently.He is a fellow, a distinguished chairman of the Planarization CMP Committee of JSPE, a chairman of the 136 Committee on Future-oriented Machining of JSPS, Electrochemical Society, and a member of some other national and international associations.

Speech Title: Luminescence behavior from RE3+ doped in glass and their application

Abstract: In this work, the luminescence behaviors and applications from trivalent lanthanide ions doped glasses have been reviewed. Glasses have advantage is recyclable, good energy storage, high soluble rare earth and can be shaped into any size of interest, including fiber. Glasses are also essential materials and can be utilized in many forms. The trivalent lanthanide ions are also a substance of interest with their optical properties, which allow a variety of technological applications. For examples, the rare earth doped materials have already been developed as sensor devices, energy saving lighting devices, optical displays, optical fibers, amplifiers, laser and scintillators. In this review, up and down conversion luminescence properties of the glasses doped with several lanthanide ions have been discussed. Moreover, the current status of their potential applications are also given.

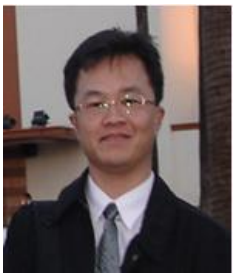
Dr. Jakrapong Kaewkhao

Nakhon Pathom Rajabhat University (NPRU), Thailand

Dr. Jakrapong Kaewkhao received Ph.D. degree in physics from King Mongkut's University of Technology Thonburi (KMUTT), Thailand, in 2008. He attended a postdoctoral short course research of an X-rays induced luminescence study in glasses, supervised by Prof. HongJoo Kim, at KyungPook National University (KNU), Korea, in 2012. In the same year, he has been awarded as the best alumni of Silpakorn University, Thailand. Through his academic career, his research interests involve glass scintillators, photonic glasses, color glasses, radiation shielding glasses (gamma and neutron), gemstone enhancements, and imitation jewelry from glasses. His research on imitation jewelry from glasses has been awarded by several national organizations, e.g., Thailand Research Fund (TRF), National Innovation Agency (NIA), The Science Society of Thailand (SST), and National Research Council of Thailand (NRCT). His recent work focuses on the development of imitation of color-changed gemstone for ornament products, and has recently been awarded by National Research Council of Thailand (NRCT) in 2015. This project has also been awarded the Best Innovation Awards by the 43rd International Exhibition of Innovation of Geneva, Switzerland, and the Medaille D'Argent Silver Medal Silbermadaille in 2015.

Currently, he is director of the Center of Excellence in Glass Technology and Materials Science (CEGM), Nakhon Pathom Rajabhat University (NPRU), Thailand. He has handled more than 55 research projects in glass science and technology, radiation physics, and gemstone enhancements. He has published 321 journals and conference proceeding (182 papers published in international journals, 473 citations and H-index = 11). He has also been a reviewer of 16 international journals, and a member of the international radiation physics society (IRPS). He has frequently been the keynoted/invited speaker in many international conferences on physics and related topics in different countries, e.g., Thailand, Korea, India, Laos, and Indonesia. In 2014, he was also a visiting professor at Radiation Science Research Institute, KyungPook National University, Korea, at Institut Teknologi Sepuluh Nopember, Indonesia, and at Sri Venkateswara University, India. Apart from his academic involvements, he is currently a consultant for color glass production and gemstone enhancements in glass and jewelry businesses.

Day 1, Saturday, May 14, 2016 - Onsite Registration Only Arrival, Registration and Conference Materials Collection	
10:00am-12:00pm 14:00pm-17:00pm	**Onsite Registration** *Venue: Lobby of University Academic Service Center, Chiang Mai University (UNISERV CMU)*

Day 2, Sunday, May 15, 2016 - Conference Day		
08:30am-08:35am	**Opening Remark - Assoc. Prof. Wassanai Wattanutchariya**	
08:35am-09:20am ＜Inthanin Room＞		**Keynote Speech 1** **Prof. Ghenadii Korotcenkov** (Gwangju Institute of Science and Technology, Korea) ***Title: Metal Oxide Nanocomposites: Advantages and Shortcomings for Application in Conductometric Gas Sensors***
09:20am-10:05am ＜Inthanin Room＞		**Keynote Speech 2** **Assoc. Prof. Wassanai Wattanutchariya** (Chiang Mai University, Thailand) ***Title: Fabrication and Characterization of Scaffolds for Tissue Engineering***
10:05am-10:20am	**Group Photo & Coffee Break**	
10:20am-11:05am ＜Inthanin Room＞		**Keynote Speech3** **Assoc. Prof. Chi-Chang Chang** (Chung-Shan Medical University, Taiwan) ***Title: Reliability Modeling and Decision Analysis in Repairable Systems***

11:10am-12:25pm ＜Inthanin Room＞	**Session ONE** **Materials Science and Application- Section A / Morning Part**
11:10am-12:25pm ＜Fai-kham Room＞	**Session TWO** **Materials Science and Application – Section B / Morning Part**
11:10am-12:25pm ＜Buathong Room＞	**Session THREE** **Metal Processing and Ceramic Technology / Morning Part**
Session ONE, TWO, THREE are not finished. They will be continued in the afternoon after invited speeches.	

12:25pm-13:30pm	**Lunch Time** **(Venue: Lemon Tree restaurant at 1st floor an old building)**

13:30pm-13:55pm ＜Inthanin Room＞		**Invited Speech 1** **Prof. Toshiro K. Doi** (KYUSHU UNIVERSITY, Japan) ***Title: Proposal and Developments of "Plasma fusion CMP" Systems combining CMP (Chemical Mechanical Polising) and P-CVM (Plasma Chemical Vaporization Machining) for Hard-to-process Materials***
13:30pm-13:55pm ＜Fai-kham Room＞		**Invited Speech 2** **Dr. Jakrapong Kaewkhao** (Nakhon Pathom Rajabhat University, Thailand) ***Title: Luminescence behavior from RE3+ doped in glass and their application***

14:00pm-15:30pm ＜Inthanin Room＞	**Session ONE** **Materials Science and Application- Section A / Afternoon Part**
14:00pm-15:00pm ＜Fai-kham Room＞	**Session TWO** **Materials Science and Application – Section B / Afternoon Part**
13:30-15:30pm ＜Buathong Room＞	**Session THREE** **Metal Processing and Ceramic Technology / Afternoon Part**
15:45pm-18:00pm ＜Inthanin Room＞	**Session FOUR** **Nanocomposite Materials and Thin Film Technology**
15:15pm-18:15pm ＜Fai-kham Room＞	**Session FIVE** **Mechanical Engineering**
15:45pm-17:30pm ＜Buathong Room＞	**Session SIX** **Computer Science and Intelligent Transportation**

19:00 pm	**Dinner Time** **(Venue: Lemon Tree restaurant at 1st floor an old building)**

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

SESSION ONE

< Materials science and application- Section A / Morning Part >

11:10am-12:25pm / Venue: Inthanin Room

Session Chair: ***Dr. Wasawat Nakkiew***
Chiang Mai University, Thailand

MT030 **11:10am-11:25am**	Effects of Zno Addition On Fe2o3/Al2o3 Oxygen Carriers on Ch4 Reduction for Chemical Looping Combustion **Sujinda Thongsermsuk**, Benjapon Chalermsinsuwan, Prapan Kuchonthara and Pornpote Piumsomboon *Chulalongkorn University, Thailand* **Keywords:** Chemical looping combustion, Reduction, $Fe_2O_3/Al_2O_3/ZnO$ Oxygen carrier **Abstract.** $Fe_2O_3/Al_2O_3/ZnO$ oxygen carriers with small content ZnO (5 wt% to 10 wt%) were prepared by physical mixing method and were evaluated its capability as an oxygen carrier in a chemical looping combustion. The combustion was conducted by using CH_4 as a fuel gas. The reduction process of $Fe_2O_3/Al_2O_3/ZnO$ oxygen carrier was carried out in a fixed bed reactor. The solid reduction products were characterized by X-ray diffraction (XRD) and Scanning Electron Microscope with EDS Attachment (SEM-EDS). The results show that the reactivity of $Fe_2O_3/Al_2O_3/ZnO$ oxygen carriers is greater than that of Fe_2O_3/Al_2O_3 which is implied the synergetic effect between ZnO and Fe_2O_3. XRD results show that the iron oxide in the oxygen carriers is reduced to metallic iron. SEM-EDS also shows that the iron agglomeration is prevented. Consequently, the suitable content of ZnO in oxygen carriers is ranged from 5 wt% to 10 wt%.
MT076 **11:25am-11:40am**	Effect of duty ratio at different pulse frequency during hole drilling in ceramics using electrochemical discharge machining **Pankaj Kumar Gupta**, Jai Prakash Bhamu, Chandra Shekhar Rajoria, Nitin Kumar Lautre, Vishnu Agrawal *Government Engineering College Bikaner, India* **Keywords:** Electro chemical discharge machining, duty ratio, pulse frequency, material removal rate, heat affected zone. **Abstract.** The Electro Chemical Discharge Machining (ECDM) is a hybridization process of electrochemical and electric discharge machining, which is used for machining of hard, brittle and nonconductive materials. The present paper investigates the effect of duty ratio at different pulse frequency on the four process responses, i.e. material removal rate, depth of penetration, surface damage and heat affected zone of the hole drilled by ECDM. The requirements of a quality drilled hole are to have less surface damage and heat affected zone along with larger depth of penetration and material removal rate. The selected alumina ceramic (Al_2O_3) work piece material is widely used in hi-tech electrical apparatus. The results were characterized by optical microscope and analysed by using pulse wave forms of voltage with time. The results

	show that the effectiveness of pulse frequency varies according to the desired response characteristics. The research findings provide the most effective duty ratio for an improved quality of drilled hole in ceramics.
MT077 **11:40am-11:55am**	Analysis of Material Removal in WEDM Operation on E0300 Alloy Steel through Channel Coding **Nitin Kumar Lautre**, Pankaj Kumar Gupta, and Chandrashekhar Jawalkar *Government Engineering College Bikaner, India* **Keywords:** WEDM, channel coding, MRR, machining parameters, alloy steel. **Abstract.** Wire-electro discharge machining (WEDM) has become an important non-traditional machining process, widely used in the aerospace, nuclear and automotive industries. The electrode which is used for WEDM is a tiny flexible brass wire, therefore in WEDM machining process, the wire behaviors and the influence of parametric conditions on the work piece needs to be well estimated. The investigations and simulations of Wire-EDM are useful for different machining conditions in practical scenario. The channel coding methodology base approach is utilized to simulate the machining parameters for better material removal rate (MRR) of the work piece of E0300 die steel. In the present work a binary symmetric channel (BSC) is used for the information that can be transmitted through the channels with encoding and decoding techniques. The various WED machining parameters selected are TON, TOFF, IP, VP, WF, WT and SV. Mathematical models are also developed to correlate the inter relationship of important factors which invariably helps for prediction of MRR during machining. The objective of this development is to estimate the MRR based on channel coding approach and verification of the results with the experimental machining parametric settings. The paper also highlights the various test results that confirm the ability of the proposed system for analyzing the effect of the various process parameters of WEDM during machining of E0300 alloy steel. The investigation also describes a simulating procedure, developed algorithms and few analyzed results of Wire EDM. The simulated values of the machining parameters obtained through the approach can be recorded and organized for a better and effective database system.
MT086 **11:55am-12:10pm**	COMPRESSIVE STRENGTH DEVELOPMENT OF HIGH STRENGTH HIGH VOLUME FLY ASH CONCRETE BY USING LOCAL MATERIAL **Mochamad Solikin** *Universitas Muhammadiyah Surakarta, Indonesia* **Keywords:** high strength concrete, high volume fly ash concrete, compressive strength, superplasticizer, slump test. **Abstract.** This paper presents a research to produce high strength concrete incorporated with fly ash as cement replacement up to 50% (high volume fly ash concrete) by using local material. The research is conducted by testing the strength development of high volume fly ash concrete at the age of 14 days, 28 days and 56 days. As a control mix, the compressive strength of Ordinary Portland Cement (OPC) concrete without fly ash is used. Both concrete mixtures use low w/c. consequently, they lead to the use of 1 % superplasticizer to reach sufficient workability in the process of casting. The specimens are concrete cubes with the dimension of 15 cm x15 cm x 15 cm. The totals of 24 cubes of HVFA concrete and OPC concrete are used as specimens of testing. The compressive strength design of concrete is 45 MPa and the slump design is ± 10 cm. The result shows that the compressive strengths of OPC

	concrete at the age of 14 days, 28 days, and 56 days are 38 MPa, 40 MPa, and 42 MPa. Whereas the compressive strength of HVFA concrete in the same age of immersing sequence are 29 MPa, 39 MPa, and 42 MPa. The result indicates that HVFA concrete can reach the similar compressive strength as that of normal concrete especially at the age of 56 days by deploying low water cement ratio.
MT087-P **12:10pm-12:25pm**	Measurement of Streaming Potential in Monitoring Alkaline-Surfactant-Polymer Flooding Tengku Amran Tengku Mohd, **Mohd Zaidi Jaafar**, Azad Anugerah Ali Rasol, and Jusni Ali *Universiti Teknologi Malaysia, MALAYSIA* **Keywords:** Streaming potential, alkaline flooding, interfacial tension, enhanced oil recovery, adsorption **Abstract.** Alkaline-surfactant-polymer (ASP) flooding is the most promising chemical Enhanced Oil Recovery (EOR) method due to its synergy of alkaline, surfactant and polymer. ASP mechanisms involve interfacial tension (IFT) reduction, adsorption, viscosity increment, wettability alteration and emulsification, which could improve the extraction of residual oil. These mechanisms change the environment in porous media and could substantially affect the streaming potential differently. Streaming potential in porous media arises from the electrical double layer, which forms at solid-fluid interface due to excess electrical charge transported by the flow. However, limited studies have been focused on the application of streaming potential in EOR processes, particularly ASP. Thus, this research aims to analyze and characterize the streaming potential in changing environment of porous media due to ASP mechanisms. The preliminary study needs to be conducted to investigate the synergy in ASP over its individual flooding and the effects on oil recovery. The streaming potential measurement should be done in individual alkaline, surfactant and polymer flooding and compared with the measurement in ASP flooding. The experimental data can be applied in a numerical model to predict the streaming potential signal that would be measured during production associated with ASP flooding. It is expected that the streaming potential changes significantly in individual, as well as in ASP flooding. The findings will provide new prospect and knowledge in the relationship between streaming potential and ASP mechanisms. Thus, measurement of streaming potential in ASP flooding is a potential approach in monitoring the efficiency of the process in enhancing oil recovery.
12:25pm-13:30pm	**Lunch Time** **(Venue: Lemon Tree restaurant at 1st floor an old building)**

SESSION ONE will be continued in the afternoon after invited speeches by

Invited Speaker 1
Prof. Toshiro K. Doi from
(KYUSHU UNIVERSITY, Japan)

13:30pm-13:55pm	Invited Speaker 1
	**Prof. Toshiro K. Doi** (KYUSHU UNIVERSITY, Japan) ***Title: Proposal and Developments of "Plasma fusion CMP" Systems combining CMP (Chemical Mechanical Polising) and P-CVM (Plasma Chemical Vaporization Machining) for Hard-to-process Materials***

Abstract: Currently, wide gap semiconductors such as silicon carbide (SiC), gallium nitride (GaN) and single crystalline diamond have attracted attention as a green device, and various research and development are being undertaken.
However, processing of SiC, GaN and diamond single crystal substrates are extremely difficult because these substrates have high hardness and high resistance to chemical reaction. Therefore, huge amount of time and cost will be required if conventional chemical mechanical polishing (CMP) is applied to final process of single crystalline diamond substrate. An innovative planarization system named "plasma fusion CMP" was developed for aiming to establish a high efficiency and high quality polishing process of the hard to process materials.
In this study, we propose a novel ultra-precision machining process of hard-to-process materials used as a substrate for green devices including SiC, GaN and diamond as an "ultimate" semiconductor substrate. The fundamental approach is to divide the process into two steps, a pre-treatment step and a finishing step.
The pre-treatment step attempts to form pseudo-radical sites in the substrate so that the surface is more readily processed and finished. In the finishing step, we not only conduct flattening process using ultra-precision polishing/CMP with an assistance of continuously formed pseudo-radical sites (in-situ forming of pseudo-radical sites and flattening process) but also introduces a processing method combining a stress-free (damage-free) P-CVM (Plasma-Chemical Vaporization Machining) utilizing high-efficiency plasma etching. It is worth noting that the combination of CMP and P-CVM is not a simple addition. Rather, our goal is to attain an innovative fusion processing technology through a synergistic effect of these two processes.

SESSION ONE

< Materials science and application- Section A / Afternoon Part >

14:00pm-15:30pm / Venue: Inthanin Room

Session Chair: Dr. Wasawat Nakkiew
Chiang Mai University, Thailand

MT042 **14:00pm-14:15pm**	An Effect of Friction Bonding Parameters to Delamination Defect Thanarat Yupapornsopa, **Suksan Prombanpong**, and Jessada Juntawangso *King Mongkut's University of Technology Thonburi, Thailand* **Keywords:** Kaolin, Zeolite A, Hydrothermal, Alkaline activation **Abstract.** The conventional technique to synthesizes zeolite A from kaolin is calcination. However, this technique has one drawback since, the impurities in kaolin, such as muscovite and quartz, remain. Therefore, the hydrothermal process without calcination is used to synthesize high purity zeolite A. Hydrothermal synthesis without calcination can be separated into two steps, namely first and second hydrothermal steps. Alkaline activation reaction in the first hydrothermal step was used to study the effect of NaOH concentration ranging from 4M, 6M, 8M, 10M to 12M at 200℃ for 3 hours. In this step, sodium aluminosilicate (cancrinite and nepheline hydrate) was produced and then dissolved in HCl. After filtration, the impurity was removed, and adjusted for neutral pH of 7 to form amorphous aluminosilicate gel. For the second hydrothermal step, amorphous gel was mixed with NaOH (1-4M) to form zeolite A at

	90℃ for 3 days. The x-ray diffraction (XRD) and Scanning Electron Microscope (SEM) were used for characterization.
MT095 **14:15pm-14:30pm**	Effects of Hydroxyapatite/Silk Fibroin/Chitosan Ratio on Physical Properties of Scaffold for Tissue Engineering Application Wassanai Wattanutchariya, Atitaya Oonjai, and **Kittiya Thunsiri** *Chiang Mai University, Thailand* **Keywords:** Tissue Engineering; Biomaterials; Lyophilization; Scaffold; Physical Properties; Mixture Design. **Abstract.** This study reports the effects of the mixing ratio of hydroxyapatite (HA), silk fibroin (SF) and chitosan (CS) on the physical properties of the scaffold used in tissue engineering. Experimental design based on mixture design was implemented to investigate the degradation rate of the scaffolds fabricated from various ratios of those biomaterials. Furthermore, pore morphology and pore size were evaluated to confirm the compatibility of the scaffold topography for cell growth and adhesion. The results from the study showed that all ratios, except pure HA solution, can be fabricated into porous scaffolds with an interconnected pore structure and appropriate pore sizes to allow all types of human cells to pass through. Furthermore, the scaffold solutions with high CS ratio resulted in a uniform pore structure and lower rates of biodegradation. Therefore, CS is recommended as the main structure because it provides the highest resistance to biodegradation. The scaffolds from various ratios may be applied for different tissue replacements in the near future.
MT1001-P **14:30pm-14:45pm**	Magnetic and electrical properties of double perovskite La2-xCaxCoMnO6 **Qiuhang Li**, and Mingxiang Xu *Southeast University, China* **Abstract.** Double perovskite La2CoMnO6 has received considerable attention due to the attractive properties (such as high ferromagnetic Curie temperature) for spin-electronic applications. The holes can be doped into La2CoMnO6 with Ca/Sr-substitution in La-site, which further enrich physical and chemical properties of La2CoMnO6 [1]. Some special magnetisms were discovered in La1.4Ca0.6CoMnO6 and La1.6Sr0.4CoMnO6 [2,3]. To our knowledge, the mechanism of hole doping effects in La2CoMnO6 system has not been comprehensive, especially the La2-xCaxCoMnO6 system. Thus, it is urgently needed to synthesize high quality sample and further explore the effects of holes on the magnetic and electrical properties of La2-xCaxCoMnO6 and the corresponding mechanisms. In this paper, polycrystalline La2-xCaxCoMnO6 (x = 0, 0.1, 0.2, 0.5) samples were synthesized by solid-state reaction. Powder x-ray diffraction (XRD) indicates that all the samples are monoclinic perovskite structure. Two transitions and exchange bias effect were detected from the field-cooling magnetization versus temperature (M-T) curves and the magnetization versus field (M-H) curves, respectively (see Fig. 1 and the insets of (a)-(d)). The phenomenons can be explained by the coexistence of ferromagnetism and antiferromagnetism. The holes may further lead to the valences of Mn ions and Co ions transforming from Mn4+ and Co2+ to Mn3+ and Co3+, respectively. This further results in the coexistence of ferromagnetic coupling (Mn4+-O2--Co2+) and antiferromagnetic coupling (Mn3+-O2--Co3+) in La2-xCaxCoMnO6 system. The resistivity of La1.8Ca0.2CoMnO6 sample decreases with the temperature increasing (see Fig. 2). Large magnetoresistance effect can be observed in La1.8Ca0.2CoMnO6 (see the inset of Fig. 2).
MT105 **14:45pm-15:00pm**	Effect of Different Photovoltaic Materials on Energetic and Exergetic Performance of Photovoltaic Thermal Arrays **Chandra Shekhar Rajoria**, Pankaj Kumar Gupta, Sanjay Agrawal,

G.N.Tiwari
Government Engineering College Bikaner, India

Keywords: BiSPVT; BiOPVT; packing factor

Abstract. The study presents the effect of packing factor of Photovoltaic (PV) module on the room temperature, cell temperature and efficiency of a proposed Building Integrated Semi-transparent Photovoltaic Thermal (BiSPVT) and Building Integrated Opaque Photovoltaic Thermal (BiOPVT) systems with duct mounted on the roof of the building. Different PV materials like mono-crystalline silicon (m-Si), amorphous silicon (a-Si), poly-crystalline silicon (p-Si), cadmium telluride (CdTe), copper indium selenide (CIS) and hetero-junction with intrinsic thin layer (HIT) have been considered in the analysis under the cold climatic condition of India. Since Srinagar (India) has the cold climatic condition, therefore, its climatic data has been considered in the present analysis.

MT089

15:00pm-15:15pm

Gas Atomizer Making to Produce Tin Powders

Kasem Pipatpanyanugoon and Chantra Nakvachiratrakul
Burapha University, Thailand

Keywords: Gas atomizer, tin powder, nitrogen gas

Abstract. The objective of this research is to make an economical laboratory-scale, horizontal gas atomizer for producing tin powders. The procedures were designing a furnace, gas chamber and cyclone, and 2-nozzle air tubes. All equipments were built and assembled to be a gas atomizer. The gas atomizer was trial run by blowing nitrogen gas to molten tins. It produced powders in many sizes. The variable conditions were the molten tin temperature, the 2-nozzle air tubes angle, and the gas pressure. The result shows that the percentage of tin powder was smaller than 150 μm. The best conditions of trial result were 300 ^{o}C of molten tin temperature, 30 degree of 2-nozzle air tubes angle, and 200 psi of gas pressure. The best result was 75.4 %. The tin powder particles were spherical shape. This research can produce an economical laboratory-scale, horizontal gas atomizer for learning metal powder.

MT044

15:15pm-15:30pm

Microstructure Change in ASSAB 760 Steel during Cementation and Quenching Process

Lydia Anggraini, Muhammad Adikusumo, and Rosfian Arsyah Dahar
President University, Indonesia

Keywords: ASSAB 760 Carbon Steel, Holding Time, Cementation, Quenching, Microstructure.

Abstract. The purpose of this research was to study the microstructure change of ASSAB 760 (equivalent to AISI 1045 and JIS S45C) steel subjected to the gas cementation and the quenching process. Gas cementation is a heat treatment surface process by means of carbon diffusing into steel. This process is carried out in a furnace in a fluidized bed by using media of liquid petroleum gas (LPG) and nitrogen gas at a temperature of 1203 K and various holding times of 7.2, 10.8 and 14.4 ks, respectively. The rapid quenching process is carried out in oil media for 420 sec. The results shows, that remnant austenite is formed on the specimen with a holding time of 7.2 ks and the networks of existing bainite structure are clearly spread on the specimen with holding time of 10.8 and 14.4 ks. Additionally, this gas cementation process when followed by the quenching process is effective in forming the martensite and austenite microstructures.

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

SESSION TWO

< Materials Science and Application –Section B / Morning Part >

11:10am-12:25pm / Venue: Fai-kham Room

Session Chair: ***Dr. Jakrapong Kaewkhao***
Nakhon Pathom Rajabhat University (NPRU), Thailand

MT024 **11:10am-11:25am**	Defect Reduction in the CO2 Laser Cutting of Glassware Rim **Aphichad Phophoung** and Viboon Tangwarodomnukun *King Mongkut's University of Technology Thonburi, Thailand* **Keywords:** Laser; Cutting; Glassware; Defect; Response surface methodology **Abstract.** Defects in glassware are unacceptable in terms of product strength and aesthetics. The unsmooth cut rim of glassware can often be found in the laser trimming of excessive part after blow molding process. Such defect is basically not safe to use and has to be rejected from the production, thereby inevitably increasing the manufacturing cost and time. Hence, this research aims to reduce the defect in glassware rim induced by the laser cutting process. A wine glass was used as a workpiece sample in this study. Laser power, laser cutting time and workpiece rotational speed were tested and optimized to reduce the defects by using the response surface methodology. The optimum condition for the laser cutting of wine glass was found to be 225-W laser power, 2.4-s cutting duration and 335-rpm rotational speed.
MT051 **11:25am-11:40am**	An Effect of Process Parameters to Anodic Thickness in Hard Anodizing Process Aunyanat Rattanasatitkul, **Suksan Prombanpong**, and Pongsak Tuengsook *King Mongkut's University of Technology Thonburi, Thailand* **Keywords:** Aluminum / Experimental Design / Hard Anodizing **Abstract.** The anodizing process is an aluminum surface treatment process which an aluminum oxide film forms on an aluminum substrate. Typically, the anodic thickness is a required specification which depends upon current density and anodizing cycle time. In addition, another important factor is ramp time which must be proper set to prevent a burn defect. Thus, this paper investigates a relationship among these three factors to determine the setting condition which minimizes the anodizing cycle time. Moreover, the required thickness must be obtained without increasing the burn defect rate. The experimental design technique is proposed to achieve this goal and it is found that the current of 35 amp, ramp time of 340sec and anodizing time at 1400 sec ensure the obtained anodic thickness greater than 30 micron.
MT053 **11:40am-11:55am**	The Study of Physical and Optical Properties of Barium Borophosphate Glasses **N. Chanthima**, N. Sangwaranatee and J. Kaewkhao *Nakhon Pathom Rajabhat University, Thailand* **Keywords:** Borophosphate; Physical properties; Optical properties

	Abstract. This research reports on the physical and optical properties of three series of borophosphate glasses combined with barium oxide (BaO), following BaBP-A, BaBP-B and BaBP-C, that were prepared by a melting and quenching process. The density, molar volume, refractive index and absorption spectra were investigated the effect of BaO on different glass structures. The results show that the densities and refractive index of the glass samples increased as the BaO (BaBP-A and BaBP-B) and B_2O_3 (BaBP-C) mole percentage increased. The molar volume of the glasses shows the adversative trend as the density: the molar volume decreased as the BaO and B_2O_3 content increased. The absorption spectra of all glass samples were slightly shifted to the longer wavelength, ultraviolet 250-350 nm, with increasing the concentration of BaO.
MT064 **11:55am-12:10pm**	Comparative Studies of the Light Yield Non-proportionality and Energy Resolution of CsI(Tl), LYSO and BGO Scintillation Crystals **P. Limkitjaroenporn**, N. Sangwaranatee, W. Chaiphaksa, J. Kaewkhao *Nakhon Pathom Rajabhat University, Thailand* **Keywords:** Non-proportionality of light yield, Intrinsic resolution, Scintillator; Photomultiplier tube **Abstract.** This article, for comparison, the non-proportionality of light yield and energy resolution of BGO, LYSO and CsI(Tl) scintillators couple to the R1306 PMT readouts were investigated. At 662 keV from ^{137}Cs source, the good energy resolution of 7.13% for CsI(Tl) superior than LYSO and BGO scintillators. The energy resolution on gamma-ray energy was also evaluated to expose the scintillator intrinsic resolution parameters. For non-proportionality of light yield, the study showed a light yield non-proportionality 0.35% of LYSO, the value is better than 4.82 % for CsI(Tl) and 1.53 % of BGO scintillators.
MT067 **12:10pm-12:25pm**	Total and Partial Photon Interactions of BaSO4-Na2O-B2O3-SiO2 Glass System N. Chanthima, J. Kaewkhao, **S. Sarachai**, N. Sangwaranatee, and N.W. Sangwaranatee *Nakhon Pathom Rajabhat University, Thailand* **Keywords:** Barium Sulfate; Photon interactions; Shielding materials; WinXCom **Abstract.** The radiation parameters of barite sodium silicoborate glass ($BaSO_4$:Na_2O:SiO_2:B_2O_3) with different concentration of barite ($BaSO_4$) were studied. The mass attenuation coefficient (μ/ρ), effective atomic number (Z_{eff}) effective electron densities ($N_{e,eff}$) and half value layer (*HVL*) have been calculated by theoretical approach using WinXCom program in the energy range of 1 keV to 100 GeV. The results of these parameters are show graphically for total and partial photon interaction. It was found that the Z_{eff} show discontinuous jumps related to absorption edges and dominance photoelectric effect at low energies, pair production have two types which are nuclear and electron field and its slightly increased with increasing photon energies. The variation of $N_{e,eff}$ was related to the value of Z_{eff}. The half value layer (HVL) of glasses were compared with commercial window and some standard shielding concretes which observed that the value of 20 mol% $BaSO_4$ has lower than commercial window, ordinary and hematite-serpentine concretes. These results showed that glass sample is promising radiation shielding materials.
12:25pm-13:30pm	**Lunch Time-Venue: Lemon Tree restaurant at 1st floor an old building**

Session TWO will be continued in the afternoon after invited speeches by Dr. Jakrapong Kaewkhao

13:30pm-13:55pm	Invited Speaker 2
	**Dr. Jakrapong Kaewkhao** (Nakhon Pathom Rajabhat University, Thailand) ***Title: Luminescence behavior from RE3+ doped in glass and their application***

Abstract: In this work, the luminescence behaviors and applications from trivalent lanthanide ions doped glasses have been reviewed. Glasses have advantage is recyclable, good energy storage, high soluble rare earth and can be shaped into any size of interest, including fiber. Glasses are also essential materials and can be utilized in many forms. The trivalent lanthanide ions are also a substance of interest with their optical properties, which allow a variety of technological applications. For examples, the rare earth doped materials have already been developed as sensor devices, energy saving lighting devices, optical displays, optical fibers, amplifiers, laser and scintillators. In this review, up and down conversion luminescence properties of the glasses doped with several lanthanide ions have been discussed. Moreover, the current status of their potential applications are also given.

SESSION TWO

< Materials Science and Application –Section B / Afternoon Part >

14:00pm-15:00pm / Venue: Fai-kham Room

Session Chair: Dr. Jakrapong Kaewkhao
Nakhon Pathom Rajabhat University (NPRU), Thailand

MT085 **14:00pm-14:15pm**	Influence on Fatigue and Biomechanics of Cone Fit of Dental Implant around the Surrounding Bone Tissue **Lei Liu**, Xiao Zhang, Yufeng Zhou, Xianshuai Chen, Yaling Wang *College of Mechanical Engineering, Shanghai University of Engineering Science, China* **Keywords:** Dental implant， FEA, Biomechanics， Fatigue analysis **Abstract.** In this paper, the purpose is to compare three different cone fit of dental implant around the surrounding bone tissue that influence on fatigue and biomechanics, it is also to provide a theoretical basis for the design and clinical application of dental implant. The method is that loading the force 100N and 200N with different angle to the three different cone with dental implant with the finite element analysis (FEA) that analyzes the stress and fatigue in ideal conditions. The Results is that when the loading is vertical, cone for 3 degrees of the implant have the best performance. The cone for 80 degrees of the implant is min among the max equivalent stress of the implants. However, comprehensive view, Cone for 24 degrees of the implant the most stable. we find that cone of different implant when subjected to the same force the maximum equivalent stress is different, smaller conical implant under vertical load force have good performance, but with the increase of the loading angle the bigger conical implant performance better.

MT100 **14:15pm-14:30pm**	Cohesion Improvement of Sand by Bio-cementation Process and Hemp Fiber **Keeratikan Piriyakul** and Janjit Iamchaturapatr *College of Industrial Technology, King Mongkut's University of Technology North Bangkok, Thailand* **Keywords:** Bio-cementation process, Hemp fiber, Cohesion **Abstract.** This research studied on the improvement of the cohesion for sand by using the bio-cementation process and hemp fiber. The bio-cementation process initiated the crystal forms of calcium carbonate ($CaCO_3$) to bind the soil particles resulting in soil mechanical improvement. Formation of $CaCO_3$ in bio-cemented sand could be useful for the stabilization of the sand or earth structures. The direct shear test performed on three sand samples; the dry sand sample, the dry sand sample treated with bio-cementation process and the dry sand sample treated with the bio-cementation process and hemp fiber. The hemp fiber of 2.5 % by volume was used. The results showed that the cohesion of the dry sand sample treated with the biocementation process comparing with dry sand was increased 78 % and the cohesion of the dry sand sample treated with the biocementation process and hemp fiber was 101 %.
MT103 **14:30pm-14:45pm**	A Review of Arc Brazing Process and Its Application in Automotive **Yong Kim**, Kiyoung Park and Sungbok Kwak *Institute for Advanced Engineering, Korea* **Keywords:** Arc brazing, Cowl cross member, Muffler component, Copper wire, Dissimilar metal joining, CMT, Low heat input **Abstract.** Brazing is a process for joining metallic materials with the aid of melted filler like solder, the melting temperature of which below that of the parent metal. In comparison to welding, it has different connection mechanisms also result in the lower energy requirement in soldering and consequential advantages such as reduced damage to the material and lower levels of distortion. Therefore, in this research, we studied about the efficiency of the GMA brazing process to compare with conventional GMA welding. Amount of rising temperature of parent metal is measured by using thermocouple and thermo-vision camera. In addition, mechanical properties and weldability such as tensile, hardness, microstructure is evaluated in lap joint structure. As the results, depending on the steel alloy used, arc brazed joints are as strong as a GMA welded joint. Furthermore, corrosion resistant is better than welding in case of stainless component. In conclusion, arc brazing process will be widely applied to thin sheet metal joining specially on automotive industry in near future.

MT2001-P

14:45pm-15:00pm

Shaping of Dense Electrolyte Film For Anode-Supported SOFC using Electrophoretic Deposition Technique

Malinee Meepho
Chulalongkorn Unveristiy, Thailand

Keywords: Electrophoretic deposition, 8YSZ electrolyte, anode-supported SOFC

Abstract. Electrophoretic deposition (EPD) technique is used for shaping 8 mol% yttria stabilized zirconia (8YSZ) thin film electrolyte on porous NiO-8YSZ anode substrate for Solid Oxide Fuel Cell (SOFC) application. A suspension containing 8YSZ nanoparticles is prepared in ethanol in corporated with a PEG dispersant at different contents of 1-19 wt%. The maximum zeta potential value is obtained for the 8YSZ suspension with 5 wt% PEG resulting in the highest deposition rate. EPD process of the 8YSZ suspension is performed at 30 V for 2 min. After co-sintering at 1400^{o}C for 1 h, dense 8YSZ electrolyte film is obtained on the NiO-8YSZ porous anode substrate. LSCF-GDC is used as a cathode in preparation of Ni-8YSZ/8YSZ/LSCF-GDC single cell SOFC. Electrochemical performances test at 800^{o}C, 700^{o}C and 600^{o}C exhibits the maximum power density of 154, 73 and 32 mW/cm^{2} respectively.

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

SESSION THREE

< Metal Processing and Ceramic Technology -Part 1 >

11:10am-15:30pm / Venue: Buathong Room

Session Chair: ***Prof. Vladimir Khovaylo***
National University of Science and Technology "MISiS", Russia

Opening Speech **11:10am-11:25am**	Direct Measurements of Magnetocaloric Effect in a Single Crystalline Ni2.13Mn0.81Ga1.06 Heusler Alloy **Vladimir Khovaylo**, Konstantin Skokov, Sergey Taskaev, Alexey Karpenkov, Dmitriy Karpenkov, Eduard Airiyan *National University of Science and Technology "MISiS", Russia* **Keywords:** Heusler alloys; single crystal; magnetocaloric effect **Abstract.** Magnetocaloric effect (MCE) in the vicinity of first order martensitic transformation and second order magnetic transition in a single crystalline $Ni_{2.13}Mn_{0.81}Ga_{1.06}$ Heusler compound was studied by a direct method. The obtained results revealed that, for the applied magnetic field strength $\mu_0 H$ = 1.9 T, MCE is irreversible in the vicinity of the first order martensitic transformation only when the MCE measurements are performed under cooling protocol. Plot of the experimentally measured adiabatic temperature change ΔT_{ad} as a function of temperature T indicated that ΔT_{ad} has a negligible benefit from the magnetic field-induced conversion of the high-temperature austenitic phase into the low-temperature martensitic phase and is mainly determined by the paraprocess of the austenitic phase around both direct and reverse martensitic transformations.
MT020 **11:25am-11:40am**	Improvement of Welding Repair Aluminium alloy 6082T6 by MIG Welding Process **Nitipon Nimaeh** and Prapas Muangjunburee *Prince of Songkla University, Thailand* **Keywords:** MIG, Al alloy, 6082T6, Repair **Abstract.** The repair welding of aluminium alloy 6082T6 with two fillers 4043 and 5356 were studied by using MIG welding process with pulse current at frequency 5 Hz. After that, macrostructure and microstructure were investigated and the density of porosity and testing of mechanical properties were determined. The results found that the density of new weld was less than repair weld. The results of mechanical tests showed that the new weld were better than the repair weld.
MT028 **11:40am-11:55am**	Effect of Alloying Elements on the Hardness Property of 90% Copper-10% Nickel Alloy **A. M. Taher** *Al Gabal Al Gharbi University, Libya* **Keywords**: copper – nickel Alloy, alloying elements, induction furnace, Vickers hardness, EDS mapping.

	Abstract. The objective of this study is to investigate the effect of adding some alloying elements (including iron, aluminum, chromium, cobalt, and titanium) to 90 wt. % copper – 10 wt. % nickel alloy on the hardness property. Copper-nickel synthetic alloys were prepared in an induction furnace, in an argon/7% vol. hydrogen atmosphere in cylindrical boron nitride crucibles. They were then homogenized at 950^{o}C for 10 hours in the same protective atmosphere. Vickers hardness measurements, microstructure examination, and Energy Dispersive Spectrometry (EDS) mapping analysis were performed for all synthetic alloys. Hardness measurements results show that the addition of all the alloying elements used in this investigation improve the hardness of the 90 wt. % copper – 10 wt. % nickel alloy. It was concluded that the aluminum was the most effective alloying element on the hardness value for 90 wt. % copper – 10 wt.% nickel alloy.
MT038 **11:55am-12:10pm**	Electrical Properties of BNKTZ Ceramics as a Function of Calcination Temperature **Pichitchai Butnoi,** Supalak Manotham, Pharatree Jaita, Ratabongkot Sanjoom, Denis Russell Sweatman, Gobwute Rujijangul *Chiang Mai University, Thailand* **Keywords:** BNKTZ, Dielectric, ferroelectric **Abstract.** In this research, the $Bi_{0.5}(Na_{0.80}K_{0.20})_{0.5}Ti_{0.99}Ti_{0.10}O_3$ were prepared via a conventional solid-state reaction method, and their properties were related with calcination temperature. The crystalline structure of BNKTZ ceramics was assessed by X-ray diffraction (XRD) method. Other physical properties, i.e. porosity, density, microstructure, and electrical properties were determined. XRD patterns for all samples showed a pure perovskite, where coexistence between rhombohedral and tetragonal phases was observed for some conditions. The optimum dielectric constant was obtained for the ceramic calcined at 800 ℃. The ferroelectric and piezoelectric properties were improved and showed the highest values for the calcination temperature around 900-1000 ℃. The improvements of ferroelectric and piezoelectric properties were proposed to be due to the ceramics had compositions closed to MPB composition. Furthermore, density also had a contribution for the improvements.
MT040 **12:10pm-12:25pm**	Effect of Electrode on Electrical and Ferroelectric Behavior of Modified BNT Lead-Free Ceramics **Ratabongkot Sanjoom**, Pharatree Jaita, Chatchai Kruae-in, Denis Russell Sweatman, Tawee Tunkasiri and Gobwute Rujijanagul *Chiang Mai University, Thailand* **Keywords:** electrode effect, ferroelectric, 0.94BNT-0.06BT, lead-free ceramics **Abstract.** In this research, the effect of electrode type on electrical i.e. dielectric and ferroelectric behavior of 0.94BNT-0.06BT ceramics was studies. The ceramics were prepared by conventional mixed oxide method. The sample exhibited a pure perovskite structure with rhombohedral phase. For dielectric measurement, the ceramics with Ag pasted electrodes exhibited very high dielectric constants and good responding with low frequency than Au sputtered electrode.
12:25pm-13:30pm	**Lunch Time** **(Venue: Lemon Tree restaurant at 1st floor an old building)**

MT054 **13:30pm-13:45pm**	Effect of High-Frequency Microwaves on The Microhardness of Alumina Ceramic **I Nyoman Sudiana**, Seitaro Mitsudo, Muhammad Zamrun Firihu, Haji Aripin *University of Halu Oleo, Indonesia* Keywords: Microwave sintering, hardness, grain size, gyrotron, alumina **Abstract.** Microwave processing of ceramics has attracted much research interest because of its significant advantages over the conventional one. Most researchers compared processes that occurred during the microwave and conventional heating at the same temperature and time. The enhancements found in the former method are indicated as a microwave effect which is usually used for explaining the phenomena in microwave processing. Numerous recent studies have been focused on the effect to elucidate the microwave interaction mechanism with materials. This paper will present effect of very high microwave frequency to hardness of sintered alumina. The sintering results were taken from a series of experiments to study the microwave effect on properties of alumina. Microwave sintering was performed by using the 300 GHz microwave sintering system. Some possible physical mechanisms are also discussed.
MT059 **13:45pm-14:00pm**	Effect of Water Flow Direction on Cut Features in the Laser Milling of Titanium Alloy under a Water Layer **Ornicha Tevinpibanphan**, Viboon Tangwarodomnukun and Chaiya Dumkum *King Mongkut's University of Technology Thonburi, Thailand* **Keywords:** Laser; Milling; Water; Flow; Titanium **Abstract.** Laser ablation under a flowing water layer can reduce thermal damage in work material and also provide a better machining performance than processing in ambient air. However, there is still a lack of insight into a more complicated process like laser milling operation in water. Besides the laser parameters, the roles of water flow direction on the cut geometries need to be elucidated to realize the viability and reliability of the laser milling process in water. This study is for the first time to reveal the effects of water flow direction on the cavity dimensions and cut surface roughness in the laser milling process performed under a flowing water layer. Titanium alloy was used as a work sample in this study. The experimental results indicated that the laser beam should travel in the same direction of water flow to provide a uniform cavity depth and smooth milled surface.
MT060 **14:00pm-14:15pm**	Study on the Performance of Orthodontic Self-drilling Correction Screw of Ti6Al4V and Stainless 316L The-Vinh Do, **Quang-Cherng Hsu**, Po-Hung Chen, Yu-Liang Chen *National Kaohsiung University of Applied Sciences, Taiwan* **Keywords:** Biomechanics, finite element analysis, self-drilling type, orthodontic bone screws. **Abstract.** In this research, the performance of orthodontic self-drilling correction screw of Titanium alloy (Ti6Al4V) and stainless steel (Stainless 316L) was analyzed by using the finite element method. SolidWorks software was employed to design the 3D models. The dimensions and geometrical parameters of the

	mini-screw according to ASTM F543-07. The analysis was conducted by using Ansys software. The biomechanical test is carried out that includes the static bending test and the torsion test. Based on the analysis of the results of the tests, the initial stability of the stainless steel screw is slightly higher than the titanium alloy screw. However, in prolonged stress results, attention to interactions with biological organisms from the medical perspective, the titanium bone screw have more advantages. In terms of the maximum load, the titanium alloy screws are better than the stainless steel screws. In terms of stiffness, the stainless steel screws proved superior to the type of titanium alloy. The orthodontic self-drilling correction screw saving of about 30% of the torque and more stable compared to the nonself-drilling type.
MT061 **14:15pm-14:30pm**	Characteristics of Machining Parameters on WEDM Titanium Alloy J.B. Saedon, **Norkamal Jaafar**, and Mohd Azman Yahaya *Ministry Of Higher Education & Universiti Teknologi MARA, Malaysia* **Keywords:** WEDM, Cutting Rate, Material Removal Rate, Surface Roughness,Kerf Width. **Abstract.** Wire electrical discharge machining is a material removal process of electrically conductive materials by the thermo-electric source of energy. This kind of machining extensively used in machining of materials with highly precision productivity. This work presents the machining of titanium alloy (TI-6AL-4V) using wire electro-discharge machining with brass wire diameter 0.5mm.The objective of this work is to study the influence of three machining parameters namely peak current, pulse off time and wire tension to cutting rate, material removal rate, surface roughness and kerf width followed by suggesting the best operating parameters towards good machining characteristics. A full factorial experimental design was used with variation of peak current, feed rate and wire tension, with results evaluated using analysis of variance techniques. Parameter levels were chosen based on best practice and results from preliminary testing. Main effects plots and percentage contribution ratios are included for the main factors and their interactions.
MT019 **14:30pm-14:45pm**	Welding Repair of Aluminium Alloy 6082 T6 by TIG Welding Process **Kraiwut Hoyingchareon** and Prapas Muangjunburee *Prince of Songkla University, Thailand* **Keywords:** TIG, HAZ, Repair. **Abstract.** This work focuses on welding repair of aluminium alloy 6082 T6 by TIG welding process. Two types of filler, 4043 and 5356 were used. A comparison at I= 120A,140A, welding speed 20cm/min and gas flow rate 15 L/min was studied. Physical characteristics, macrostructure and microstructure at weld metal and Heat Affected Zone(HAZ) were investigated. Which at 140A can welding repair. The parameter 140A have complete melting and fail area at HAZ and mechanical properties more than 120A.

MT088

14:45pm-15:00pm

Thermal and Physical Properties of White-opaque Sanitary Glazes using Lampang Pottery Stone as Raw Materials

Pakawadee Sirilar, Nakorn Srisukhumbowornchai, Purit Thanakijkasem, Somnuk Sirisoonthorn and Gernot Klein

KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI, THAILAND

Keywords: glaze-body fit, gloss, lightness, melting characteristic, thermal expansion

Abstract. The aim of this work was to determine thermal and physical properties of white-opaque sanitary glazes. Lampang pottery stone was used to replace silica (G2) and feldspar (G3) in the commercial sanitary glaze (G1). All formulations of glazes developed from Seger formula calculation and the glaze slurry was prepared by wet milling, green glazing on commercial ceramic body and firing at 1200°C with heating rate of 3°C/min by using electric kiln. Melting characteristics, specular gloss, lightness, color, and thermal expansion behavior of all sanitary glazes were investigated. As a result, the glaze G2 was a good reflecting surface with high lightness value. Linear thermal expansion difference at 500°C between the glaze G2 and the commercial ceramic body was -0.015%. This glaze-body fit was, therefore, under small compression and compatible to ceramic sanitary products.

MT090

15:00pm-15:15pm

Effect of Porosity on Residual Stress of 2024-Aluminum GTAW Specimen

Pattarawadee Poolperm, Wasawat Nakkiew

Chiang Mai University, Thailand

Keywords: GTAW, Radiographic testing, Porosity, X-ray diffraction, Residual stress

Abstract. Aluminum alloys are used widely in many applications due to its low in density which can lead to a lightweight product. A high percentage of Cu in the chemical composition of the 2024 aluminum alloys helps withstand the occurrence of corrosion as well. Thus, aluminum alloy grade 2024 is used as a material for several parts in aircraft and spacecraft components, (e.g. the body of commercial airplanes), as well as parts in many other applications. Gas Tungsten Arc Welding (GTAW) is used widely in joining material parts together. Inappropriate welding parameters usually cause problems such as porosity in the welding. The occurrence of porosity is undesirable in welding because it can affect the strength of the welding area as well as other properties. Tensile residual stress near the surface of the material expedites the fatigue crack initiation. The relationship of porosity and residual stress for GTAW parts was very limited in literatures. Therefore, the objective of this research was to investigate the relationship of porosity to the occurrence of residual stress after the welding process. Full factorial design of experimental technique was used for setting up welding conditions of the GTAW. The specimen with highest porosity was selected for further analysis of its effect on residual stress. Porosity was analyzed by the radiographic testing (RT) and the residual stress was measure by X-ray diffraction (XRD) using $\sin^2 \psi$ method. The results showed that the highest porosity in the welded bead was found at the current of 130 A, the welding speed of 210 mm./min., and the wire feed rate of 700 mm./min. The results also suggested that lower current and welding speed caused an increase in porosity. The residual stress results on both longitude and transverse directions showed tensile residual stress at locations around the welded bead area.

MT098 **15:15pm-15:30pm**	Effect of Precipitate on Microstructure Evolution and Hardness of Al-Cu Alloy during Torsion Deformation **Sunisa Khamsuk**, Nokeun Park, Daisuke Terada, Nobuhiro Tsuji *Burapha University, Thailand* **Keywords:** Al-Cu alloy; Precipitate; Torsion deformation; Microstructure **Abstract.** The effect of precipitate on microstructure evolution and hardness of Al-Cu alloy during torsion deformation has been investigated, by comparing the evolution of microstructure in aged Al-2wt.% Cu alloy with commercial purity aluminum (1100Al). The microstructure evolution is studied by Transmission Electron Microscopy and Electron Backscatter Diffraction, and hardness is measured using Vickers hardness measuring instrument. It is found that the presence of precipitate enhance the grain refinement and hardness of Al-Cu alloy. By applied equivalent strain of 3.26, the (sub)grain size of 86 nm is achieved. In contrast, the presence of precipitate is found to be inhibiting the development of high angle grain boundary.

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

Session FOUR

< Nanocomposite Materials and Thin Film Technology >

15:45pm-18:00pm / Venue: Inthanin Room

Session Chair: ***Assoc. Prof. Wassanai Wattanutchariya***
Chiang Mai University, Thailand

MT017 **15:45pm-16:00pm**	Preparation of Zeolite Nanocrystals via Hydrothermal and Solvothermal Synthesis using of Rice Husk Ash and Metakaolin **Naruemon Setthaya**, Prinya Chindaprasirt, and Kedsarin Pimraksa *Chiangmai University, Thailand* **Keywords:** zeolite nanocrystals, hydrothermal, solvothermal, rice husk ash, metakaolin **Abstract.** Synthesis of zeolite nanocrystals from rice husk ash and metakaolin was studied. Hydrothermal and solvothermal methods at 120 ℃ for 6 h were used as comparative study. Starting mixes were prepared with SiO_2/Al_2O_3 molar ratio of 4. Two factors; stirring time before hydrothermal and solvothermal treatments and solvent types were studied. The synthesized products were characterized in terms of mineralogy using X-ray diffraction, specific surface area using N_2 adsorption and desorption isotherm, morphology and composition using scanning electron microscopy and electron dispersion X-ray analysis. The results showed that faujasite and zeolite P1 were obtained from both of hydrothermal and solvothermal methods. However, crystals sizes of the synthesized zeolites from solvothermal method were smaller than that of hydrothermal method in that 100-300 nm and 100-1500 nm for solvothermal and hydrothermal methods, respectively. Specific surface area of the zeolites obtained from hydrothermal and solvothermal methods were 418 and 487 m^2/g, respectively.
MT055 **16:00pm-16:15pm**	Effects of TEOS Precursor and Reaction Time on the Synthesis of Silica Coated Single-Walled Carbon Nanotubes **Wanchart Suprompituk**, Thana Radpakdee, Nantiwat Pholdee, Papot Jaroenapibal *Khon Kaen University, Thailand* **Keywords:** Carbon nanotubes, Silica coating, Anionic surfactant, Composite **Abstract** This paper demonstrates a technique to synthesize silica-coated single-walled carbon nanotubes (SWNTs@SiO_2) based on docecyl sulfate (SDS), 3-aminopropyltriethoxysilane (APTES), ammonium hydroxide (NH_4OH) and tetraethyl orthosilicate (TEOS). The coating of silica is done to promote bond strength between SWNTs@SiO_2 and other materials. The anionic surfactant used in the coating process helps create linkages between the silica coupling agent and the SWNTs' walls without compromising the excellent properties of SWNTs. Scanning electron microscopy (SEM), transmission electron microscopy (TEM), and energy dispersive x-ray spectroscopy (EDX) were employed to characterize the sizes of

	SiO_2 particles, the structure of SWNTs@SiO_2, and the elements existed in the materials. The size of SiO_2 particles has shown to be dependent on the amount of TEOS concentration and reaction time. Higher TEOS concentration and longer reaction time led to larger SiO_2 particles. Successful coatings of SiO_2 on SWNTs have been demonstrated. Silica appeared to be uniformly coated on the SWNTs surfaces. The thickness of the coating layer was found to be approximately 3-7 nm.
MT056 **16:15pm-16:30pm**	Impedance Spectroscopic Inspection toward Sensitivity Enhancement of Ag-doped WO3 Nanofiber-based Carbon Monoxide Gas Sensor **Pundaree Boonma**, Papot Jaroenapibal, Mati Horprathum, Sathiraporn Pornnimitra, Boonying Charoen, and Napat Triroj *Khon Kaen University, Thailand* **Keywords:** Tungsten oxide nanofibers, Ag nanoparticle doping, Electrospinning, Impedance spectroscopy, Carbon monoxide gas sensors. **Abstract.** This work reports the impedance analysis and carbon monoxide gas sensing response of tungsten oxide (WO_3) nanofibers with silver (Ag) nanoparticle doping. The Ag-doped WO_3 nanofibers were prepared by an electrospinning technique. The impedance spectroscopic measurements of undoped and Ag-doped WO_3 nanofibers were performed to study the contribution of electrical parameters involved in the electron transport. The impedance modeling obtained from the fitted Nyquist plot shows that the RC components attributed to Ag-WO_3 interface are introduced to the system upon Ag addition. Carbon monoxide (CO) gas detection was carried out by resistance measurement using a DC method. The sensitivity of Ag-doped WO_3 nanofibers is found to be greater than that of the undoped sample. The improved sensitivity is derived from the high interface resistance between Ag and WO_3 grains. The contribution of Ag dopants is conceived to induce electronic structure alteration of the sensor material.
MT094 **16:30pm-16:45pm**	Preparation and Characterization of Bionanocomposite Films Made from Carrageenan, Beeswax and ZnO Nanoparticles **Bayu Meindrawan**, Nugraha Edhi Suyatma, Tien R. Muchtadi, Evi Savitri Iriani *Bogor Agricultural University, Indonesia* **Keywords**: Biopolymer, Beeswax, Carrageenan, Nanocomposite, ZnO nanoparticles **Abstract.** The objective of this study was to develop biopolymer based films as alternative of synthetic petroleum based-packaging. The ZnO NPs (0.5 and 1% $^{w}/_{w}$ carrageenan) and beeswax (3% $^{v}/_{v}$), as hydrophobic component, were incorporated into carrageenan polymer to produced bionanocomposite films. The resulting films were characterized using SEM. The physical and mechanical properties of films were also investigated. The addition of ZnO NPs and beeswax resulted in different morphological surface as well as influenced the surface color of carrageenan film. Incorporation of ZnO NPs increased TS and EAB of the film, while WVTR decreased. Furthermore, the presence of beeswax within the carrageenan and or its nanocomposite films promoted synergistic effect with ZnO NPs in reducing WVTR and EAB, however decreased TS of films. Therefore, these bionanocomposite films were potentially used in packaging industry to maintain the quality of food stuffs.

MT097 **16:45pm-17:00pm**	Physico-Mechanical Properties of Starch-based Nanocomposite Film Incorporated with Hydrothermally Synthesized Zinc Oxide Nanoparticles **Yandi Andiyana**, Nugraha Edhi Suyatma, Suliantari *Bogor Agricultural University, Indonesia* **Keywords:** ZnO Nanoparticles, Hydrothermal Synthesis, Tapioca Starch, Nanocomposite film. **Abstract.** Zinc oxide nanoparticles (ZnO-NPs) were successfully prepared by hydrothermal method at low temperatures (80 ℃) for 2 hours using zinc nitrate as starting materials. The average size of hydrothermally synthesized ZnO-NPs were comparable with commercial one as confirmed by Particle Size Analyzer (PSA). The incorporation of hydrothermally synthesized ZnO-NPs (0.5% and 1%, w/w) and glycerol as plasticizer (20%, w/w) into tapioca starch film significantly reduce water absorption capacity and water vapor transmission rate while increasing tensile strength and elongation at break of the composite film. These results suggest that hydrothermally synthesized ZnO-NPs have the potential as nanofiller to improve the physical and mechanical properties of biobased film.
MT1002-P **17:00pm-17:15pm**	Properties of CuInS2 Nano-particles on TiO2 by Spray Pyrolysis for Solar Cell **Gye-Choon Park**, Kil-Ju Na, Su-Ji Park *Mokpo National University, Korea* Keywords: Ⅰ-Ⅲ-Ⅵ2 chalcopyrite semiconductor, photocatalyst, absorption layer, solar cell, X-Ray Diffractor, Field Emission Scanning Electron Microscope, Atomic Force Microscope, CuInS2, TiO2, UV-Visable Spectrophotometer **Abstract.** CuInS2, a Ⅰ-Ⅲ-Ⅵ2 chalcopyrite semiconductor with a direct band gap of 1.5 eV is attractive as photovoltaic solar cell material, contrary to TiO2, a large bap gap semiconductor with 3.2 eV is a widely used photocatalyst due to its high stability, favorable band gap energy inexpensive cost and abundant availability. For this paper, copper indium disulfide(CuInS2) nano-particles on TiO2 porous film have been fabricated by spray pyrolysis for absorption layer of solar cell. Structural and optical properties of the CuInS2 nano-particles were analyzed according to composition ratios of Cu:In:S. Crystalline structure, surface morphology and crystalline size were investigated by X-Ray Diffractor(XRD) and Field Emission Scanning Electron Microscope(FESEM), and high-resolution TEM(HRTEM) respectively. And optical property was characterized by UV-Visable Spectrophotometer espectively. Size of CuInS2 nano-particle which was made at around 350℃ was smaller than 16 nm, and CuInS2 particles size increased with the rise of heat-treatment temperature and time. But, as the size of CuInS2 nano-particle decreased, optical absorption edge of ternary compound film moved to blue wavelength band. And, optical energy-band gap of the compound films ranged from 1.48 eV to 1.53 eV.
MT2003-P **17:15pm-17:30pm**	Growth and in-situ Annealing of Initial Layer in Bi2Te3 Epi-layers by Molecular Beam Epitaxy **Duc Duy Le**, Trong Si Ngo, Soon-Ku Hong *Chungnam National University, Korea* **Key words:** Bismuth telluride, Annealing, Epitaxy, Thermoelectric.

Abstract. During the past decades, bismuth telluride has attracted intense interest because it is one of the best thermoelectric materials at low temperature region in addition to its potential topological insulator properties1-3. Bulk single crystals of Bi2Te3 could be grown from Bi–Te melts, however for practical device applications, epitaxial layers are highly desired. Among thin films deposition techniques, the Molecular Beam Epitaxy(MBE) technique has many advantages including convenient physical deposition (without conceiving the complexity of chemistry), accurate film thickness, excellent potential in doping control, and possible integration of heterostructures and/or superlattices. We report comprehensive studies of the crystal structure and growth processes of Bi2Te3 epitaxy films grown by MBE. By applying in-situ annealing to an initial thin epi-layer of Bi2Te3, both the smoothness and crystal quality of the films were improved. Several growth conditions for the first initial layer growth step followed by annealing were applied. The growth of second layer epitaxy films took the advantage of the smooth morphology and good crystallinity of the optimized first layers. The growth and annealing processes were monitored by in-situ reflection high energy diffraction. The morphology and crystal structural of the films were characterized by atomic force microscope, scanning electron microscopy and high-resolution x-ray diffraction method. The effects of structures to the film's electrical and thermoelectric properties were also investigated.

MT2004-P

17:30pm-17:45pm

Growth of Ga2O3 Films on (0001) Sapphire Substrates using in-situ GaN-buffer layer by Plasma Assisted Molecular Beam Epitaxy

Trong Si Ngo, Duc Duy Le, Soon-Ku Hong
Chungnam National University, Korea

Keywords: Ga_2O_3, Plasma Assisted Molecular beam epitaxy (PAMBE), GaN buffer layer.

Abstract. Gallium oxide (Ga_2O_3) is a wide-bandgap material. Ga_2O_3 film is a potential candidate for applications as high power devices [1], deep-UV photodetectors [2] and transparent electronic devices [3]. Various techniques have been employed to grow Ga_2O_3 films such as chemical vapor deposition (CVD) [4], pulsed laser deposition (PLD) [5], Plasma Assisted Molecular Beam Epitaxy (PAMBE) [2]. Moreover, due to the popular of sapphire substrate, the growth of Ga_2O_3 films on c-plane sapphire have been attracted alot of interest. In this work, we report the growth and characterization of Ga_2O_3 films on c-plane sapphire with and without in-situ GaN buffer layer by MBE technique. First, Ga_2O_3 films were grown on c-plane sapphire substrates at various growth temperatures to find out one good growth conditions. In the second set of experiment, Ga_2O_3 films were grown on GaN-buffered sapphire substrates with the same optimized growth conditions. The in-situ GaN buffer layer was grown on nitridated c-plane sapphie substrate and then the grown GaN layer was oxidized by using oxygen plasma. This oxidized layer has a role as a nucleation layer for the growth of Ga_2O_3 film. Then, Ga_2O_3 film was grown on the oxidized GaN buffer layer. The effects of oxidized GaN buffer layer on the Ga_2O_3 film were investigated. The growth processes were monitored by in-situ reflection high energy electron diffraction (RHEED) observation. The crystal quality and orientation were characterzied by X-ray diffraction. The surface morphology and growth rate were investigated by atomic force microscope and scanning electronic microscope.

MT2007-P **17:45pm-18:00pm**	Research on the preparation, biocompatibility and bioactivity of magnesium matrix hydroxyapatite biological composite material **Li Linsheng**, Lin Guoxiang, Chen Aihua *University of South China, China* **Keywords:** Magnesiunm alloys; Electrophoretic deposition; Coating; Biological composite material；Biocompatibility；Bioactivity **Abstract:** In this paper, magnesium matrix hydroxyapatite biological composite material was prepared by electrophoretic deposition method. The optimal process parameters of electrophoretic deposition were HA suspension concentration of 0.02 kg/L, aging time of 10 days and voltage of 60V. Animal experiment and SBF immersion experiment were used to test the biocompatibility and bioactivity of this material respectively. The SD rats were divided into control group and implant group. The implant surrounding tissue was taken to do tissue biopsy, HE dyed and organizational analysis after a certain amount of time in the SD rat body. The biological composite material was soaked in SBF solution under homeothermic condition. After 40 days, the bioactivity of the biological composite material was evaluated by testing the growth ability of apatite on composite material. The experiment results showed that magnesium matrix hydroxyapatite biological composite material was successfully prepared by electrophoretic deposition method. Tissue hyperplasia, connective tissue and new blood vessels appeared in the implant surrounding soft tissue. No infiltration of inflammatory cells of lymphocytes and megakaryocytes around the implant was found. After soaked in SBF solution, a layer bone-like apatite was found on the surface of magnesium matrix hydroxyapatite biological composite material. The magnesium matrix hydroxyapatite biological composite material could promot calcium deposition and induce bone-like apatite formation with no cytotoxicity and good biocompatibility and bioactivity.
Starting from 19:00 PM	**Dinner Time**

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

SESSION FIVE

< Mechanical Engineering >

15:15 pm -18:15 pm / Venue: Fai-kham Room

Session Chair: Assoc. Prof. Chi-Chang Chang
Chung-Shan Medical University, Taiwan

MT106 **15:15pm-15:30pm**	A Determination of Optimal Feed Rate and Work-pieces Coating on Two Spray Booths and Continuously Feeding to an Oven Nattipa Yampien, **Suksan Prombangpong**, and Pongsak Tuengsook *King Mongkut's University of Technology Thonburi, Thailand* **Abstract**—One of the important processes in cookware manufacturing is a coating process where coating material is sprayed to cover an interior and/or exterior surface of a product. Then, the product must be baked in the oven at certain temperature profile to dry the coated surface. The spray and bake processes are continuous and must be balanced; however, the oven capacity tends not to be fully utilized. This is due to the fact that cookware product is designed in different sizes and shape. Therefore, a feed pattern and feed rate must be calculated to match with oven capacity in order to maximize its capacity. Thus, the objective of this paper is to reveal detailed calculation and its result to achieve this goal and it can be an example for other similar applications. **Index Terms**—Feed rate, Optimization, Oven capacity, Spray coating
D203 **15:30pm-15:45pm**	Design of an agricultural robotic platform with omni-directional motion **Widagdo Purbowaskito** and Chung-Hao Hsu School of Manufacturing Systems and Mechanical Engineering, Sirindhorn *International Institute of Technology, Thammasat University, Thailand* ***Abstract***—In recent years, the agricultural robotic technology is adopted as one of solutions in agricultural industry. A lot of research has been done on the development of agricultural robots with high capability. Mostly the agricultural robots are designed with skid steering and ackerman steering systems. Limitation of the skid steering and ackerman steering systems is a non-holonomic constraint. This non-holonomic constraint limits the maneuverability of an agricultural mobile robot. In this paper, a new design of a mobile robotic platform for agricultural applications is presented. The agricultural robot is designed with capability to perform the omni-directional motion. This omni-directional motion is an ability of a mobile system to move without limitation by a non-holonomic constraint. The agricultural mobile robot is designed with special steering systems that allow the agricultural mobile robot to perform the omni-directional motion. Compared with conventional skid-steering and ackerman steering agricultural mobile robots, the newly designed agricultural mobile robot provides more maneuverability. It can perform omni-directional motion and can achieve skid-steering and ackerman steering motion as well. This paper offers new ideas in terms of agricultural robot mobility.
MT007 **15:45pm-16:00pm**	Life Extension of Propeller Shafts by Hardfacing Welding **Siva Sitthipong**, Prawit Towatana, Amnuay Sitticharoenchai and Chaiyoot

	Meengam *Prince of Songkla University, Thailand* **Keywords:** propeller shafts, hardfacing, life extension, welding repair process **Abstract**. At present the Cut-stern Kolek Boats of local fishermen at Kaoseng Community on the Coast of Songkhla Lake have a high rate of shaft failure. Consequently, the fishermen have spent lots of money on maintenance program of repairing shafts for a few years. Besides, the repairing cost, each time of the failure also causes water pollution from the leakage of grease. The incomplete transmission of power leads to engine overloading and fuel wasting. The investigation of the high failure rate of propeller shafts which were major machine component in power transmission illustrated the failure in normal fracture caused by the mechanisms of metal fatigue. Using the welding repair by shield metal arc welding process did not give the satisfied outcome because it created the short service life of reused propeller shafts after repairing. This research was aimed to study the metal fatigue behavior of long tail shafts in the Cut-stern Kolek boats and introduce the new method of welding repair process to prolong their service life. The experiment revealed that specimens resulted from the new welding repair process and the conventional one possessed different service life. The new process used the flux core which arc welding can prolong the service life of the shafts of boats more than 1.6 times of using the conventional method which is the electric welding by flux core arc welding. The research result will be extended to fishermen, in order to encourage them to become a part of sustainable inshore fisheries.
MT045 **16:00pm-16:15pm**	Study on Effect of Process Parameters on End Wear of Tool Electrode during Planetary EDM of Ti-6Al-4V **Vishal J. Mathai**, Harshit K. Dave, Keyur P. Desai *S. V. National Institute of Technology, Surat, Gujarat, India* **Keywords:** EDM, planetary, titanium, tool kinematics, wear. **Abstract**—Electro Discharge Machining (EDM) is one of the most widely accepted advanced machining process to machine hard to machine electrically conductive materials. However, the inferior physical properties of the workpiece tend to make process unstable resulting into heavy loss of material from the tool electrode thereby leading in to generation of inaccurate features. In present work, an attempt has been made to study the effect of various process parameters viz. pulse ON time, duty factor, gap voltage and polarity of the tool electrode on end wear of the tool electrode and wear ratio during planetary EDM of Ti-6Al-4V. One factor at a time methodology has been employed to study the parameter effects. Results suggest that distortion on the tool electrode during EDM of Ti-6Al-4V is highly influenced by the pulse ON time level as well as polarity of the tool electrode employed. Further, it has also been understood that lower levels of duty factor and higher levels of gap voltage are preferable for efficient machining of titanium alloys.
MT046 **16:15pm-16:30pm**	Application of Radial Tool Movement in Electrical Discharge Machining Process for Boring Operation **Sudhanshu Kumar**, Harshit K. Dave, and Keyur P. Desai *S. V. National Institute of Technology, Surat, Gujarat, India* **Abstract—**The objective of this research work is to perform boring operation in electrical discharge machining process on AISI 304 workpiece material. Boring operation was successfully accomplished using tool actuation on radial path in

	electrical discharge machining process. The diameter of predrilled hole cavities were enlarged to 10 mm bore diameter. The boring operations were performed with three different diameter of tool electrode i.e. 7, 8 and 9 mm at three different orbital speed of tool electrode i.e. 0.05, 0.09 and 0.13 mm/s. The machining responses were measured in terms of material removal rate (MRR), surface roughness (Ra) and radial overcut (Oc). **Index Terms—** boring, EDM, orbital, radial.
MT092 **16:30pm-16:45pm**	Failure Analysis of Hydraulic Rotary Drill Rods in a Limestone Mine **Anirut Chaijaruwanich** and Chatchanok Thongthip *Chiang Mai University, Thailand* **Keywords:** Rotary drill, Failure analysis, Surface fractography, Fatigue, Low alloy steel **Abstract.** Failure analysis of two hydraulic rotary drills used for rock drilling was carried out. Chemical analysis, metallurgical examination, surface fractography and hardness measurement were used for the analysis. The failed drill rods composition matched with low alloy 31NiCrMo13-4 grade steel. The hardness measurement results suggested that the drilled rods were surface hardened. Surface fractography examination revealed that crack initiation of the fractured drill rods started at the outer surface, especially at the joint between the drill rod and drill bit. The mode of failure was found to be fatigue. The stress concentration locating at groove of threads at the joint was likely to cause the crack initiation. Propagation of fracture was observed with the evidence of beach mark, resulting from continuous nominal low stress.
MT093 **16:45pm-17:00pm**	Alternative Optical Acquisition Technique for Supporting Reverse Engineering Process Suchada Rianmora and **Molticha Rangsiyangkoon** *Thammasat University, Thailand* **Abstract—**In product development phase, Reverse Engineering (RE) can help to rapidly create the design of the new product while satisfying the customer's satisfaction. Optical acquisition technology can be applied in data acquisition phase of RE process to minimize time and number of activities. Time spent for accomplishing RE process and the accuracy of the surface finish (3D virtual model) depend upon the method selected for acquiring an entire surface of an existing part. This research introduces the acquisition system by using optical acquisition technologies where 3D laser scanner, displacement sensor, and digital camera have been presented and discussed. **Index Terms—**Laser processing technology, reverse engineering (re), data acquisition, optical signal processing, and 3d triangulation process.
D202 **17:00pm-17:15pm**	Early estimation of work contents for planning the one-of-a-kind production by the example of shipbuilding **Jan Niklas Sikorra**, Axel Friedewald and Hermann Lödding *Hamburg University of Technology, Germany* ***Abstract—***A transparent, reliable early estimation of work contents is crucial for capacity planning in shipyards. Yet most of the shipyards rely on practical experience of specialized production planners, for the early capacity estimation, which are prone to errors, as a bill of material is not available in the early stages of

	production planning in the one-of-a-kind production. This is due to a yet unfinished construction of the ship. This paper will discuss a method for creating a computer-supported, transparent, more reliable way for the estimation of work content, at an early planning stage of a one-of-a-kind production, using a generated bill of material. The bill of material is generated automatically using parametrized templates and contains steel and outfitting parts. Therefore a tool has been developed that generates steel and outfitting parts from parametrized templates. From the bill-of-material, the work content in hours is estimated by linking the parts in the bill-of-material to a process. The operation time can then be calculated by dividing the work content by the capacity of the work system. The operation time can then be used for scheduling the one-of-a-kind production.
RE02 **17:15pm-17:30pm**	Fatigue Life Assessment of Weld Surfacing of LB 52 Solid Wire on SCM 440 Alloys Steel Propeller Shafts **Siva Sitthipong**, Prawit Towatana and Amnuay Sitticharoenchai *Prince of Songkla University, Thailand* ***Abstract*—**The damage to the propeller shaft, a principal mechanical component in the power transmission system of the Kolek Boats makes engines work harder than normal attributed to less transmission efficiency. Operating boats with the damaged propeller shaft increases the rate of fuel consumption per distance and cost of fishing which affects income of coastal fishermen. The result of a preliminary survey of Cut-Stern Kolek Boats at Kaoseng Community revealed that the service life of the damaged propeller shafts caused by the fatigue failure would be repaired by shield metal arc welding process. The statistical analysis showed that the useful life depended on fatigue endurance limit of welding surface. When they were back to be used again. The objective of this research was to study the fatigue life of hardfacing surface LB-52 solid wire. The method of this research included)a) building up the hardfacing surface (b) forming specimen from hardfacing surface and (c) finding out the fatigue life by fatigue testing machine base on ASTM E739-91 standard. The results of this research indicated that hardfacing surface LB-52 could not receive fatigue stress exceed 500 MPa. The propeller shafts after being repaired will have very short service life, which is not feasible in engineering economy. ***Index Terms*—**Propeller shaft, hardfacing surface, solid wire fishing boats.
RE06 **17:30pm-17:45pm**	A robust One-class Support Vector Machine using Gaussian-based Penalty Factor and its Application to Fault Detection **T. Prayoonpitak** and S. Wongsa *King Mongkut's University of Tecnology Thonburi, Thailand* ***Abstract***—In recent years, one-class support vector machine (SVM) approaches have received particular attention in fault detection since only one class of the data is required for training. However, the training data can be corrupted with the outliers that influence classifier performance significantly. In this paper, a Gaussian-based penalisation has been proposed in the formation of a robust one-class SVM model which constructs the decision boundaries that are robust to the outliers without compromising the classification performance. The efficacy of the proposed method has been compared with the traditional one-class SVM and a previous robust one-class SVM method in the literature when applied in three datasets: the Iris's Fisher dataset, banana-shaped dataset and MFPT bearing fault dataset. It is shown that the proposed robust one-class SVM outperforms other methods. ***Index Terms***—Robust one-class SVM, penalty factor, fault detection, outliers.

RE07 **17:45pm-18:00pm**	Optimization of Plasma Spray Process VIA Orthogonal Test Design Method, SVM, and Improved PSO **Jing Xue** and Min Huang *Beihang University, China* **Abstract—**Plasma spray is a widespread thermal spraying technology due to its unique advantages, but control of various defects in the coating is still the major trouble currently faced in the field. The key problem left to be solved is how to determine the optimum combination of input process parameters to achieve the required quality of coating. This research work integrates Orthogonal Test Design Method, Support Vector Machine (SVM), and Particle Swarm Optimization (PSO) algorithm to ascertain the optimal process parameter settings of the plasma spray. Orthogonal Test Design method is used to design a set of representative experiments for reducing the number of tests, simultaneously, accessing to the most valuable sample data. The data obtained from orthogonal test is used as samples for training and testing SVM so as to establish relation model between process parameters and the coating quality. Then, SVM is combined with Improved PSO to find the optimal combination of spraying parameters. In the end, the verification test is implemented to verify the effectiveness of the optimal process parameters. In this paper, the proposed method is applied to determine the optimal process parameter settings of aero-engine seal coating formed by plasma spray. The experimental results show that this method can overcome the shortcomings of the traditional orthogonal test which only obtain a discrete optimization and the difficulties to optimizing the complex systems when there are small samples or the high number of dimension, furtherly obtain the optimal ones in the continuous ranges of plasma spray process parameters, which contributes to spraying coatings with the best quality. **Index Terms—**Plasma spray, Orthogonal Test Design Method, Support Vector Machine, Particle Swarm Optimization.
RE10 **18:00pm-18:15pm**	A maintenance time measurement methodology under the combination of ergonomics and virtual simulation **Zhou Xinxin**, Zhou Dong and, Guo Ziyue *Dalian University of Technology, China* ***Abstract***—The index of the maintenance time is very important in the maintenance design , a efficient maintenance time measurement methodology plays an important role in the early stage of the maintenance design, though there are many methods to measure the maintenance time ,they ignore the relationship between line production and the maintenance work. This paper proposes a corrective MOD method considering several man-machine factors, on the basis of the decomposition of maintenance task, the original MOD value of maintenance therbligs which described in virtual simulation environment can be got. With the influence factor of ergonomics and DELMIA analysis tools, the influence coefficients of several factors are discussed to correct MOD value. Finally, a case verifies the practicability and effectiveness of the method. ***Index Terms***—maintainability, human factor, virtual reality, Motion-time
Starting from 19:00 PM	**Dinner Time**

Note: The following time arrangement is for reference only. In case that any absent presenter or some presentations are less than 15 minutes, please come at least 15 minutes before your presentation.

SESSION SIX

< Computer Science and Intelligent Transportation >

15:45 pm -17:30 pm / Venue: Buathong Room

Session Chair: ***Assoc. Prof. Nursuriati Jamil***
Universiti Teknologi MARA, Malaysia

Opening Speech **15:45pm-16:00pm**	Rule-Based Storytelling Text-to-Speech (TTS) Synthesis Izzad Ramli, **Nursuriati Jamil**, Noraini Seman and Norizah Ardi *Faculty of Computer and Mathmatical Sciences, Universiti Teknologi MARA, Malaysia* ***Abstract*****—**In recent years, various real life applications such as talking books, gadgets and humanoid robots have drawn the attention to pursue research in the area of expressive speech synthesis. Speech synthesis is widely used in various applications. However, there is a growing need for an expressive speech synthesis especially for communication and robotic. In this paper, global and local rule are developed to convert neutral to storytelling style speech for the Malay language. In order to generate rules, modification of prosodic parameters such as pitch, intensity, duration, tempo and pauses are considered. Modification of prosodic parameters is examined by performing prosodic analysis on a story collected from an experienced female and male storyteller. The global and local rule is applied in sentence level and synthesized using HNM. Subjective tests are conducted to evaluate the synthesized storytelling speech quality of both rules based on naturalness, intelligibility, and similarity to the original storytelling speech. The results showed that global rule give a better result than local rule
D02 **16:00pm-16:15pm**	3D Web-based HMI with WebGL Rendering Performance **Atitayaporn Muennoi**, Daranee Hormdee *Khon Kaen University, Thailand* ***Abstract*****—**An HMI, or Human-Machine Interface, is a software allowing users to communicate with a machine or automation system. It usually serves as a display section in SCADA (Supervisory Control and Data Acquisition) system for device monitoring and control. In this paper, a 3D Web-based HMI with WebGL (Web-based Graphics Library) rendering performance is presented. The main purpose of this work is to attempt to reduce the limitations of traditional 3D web HMI using the advantage of WebGL. To evaluate the performance, frame rate and frame time metrics were used. The results showed 3D Web-based HMI can maintain the frame rate 60FPS for #cube=0.5K/0.8K, 30FPS for #cube=1.1K/1.6K when it was run on Internet Explorer and Chrome respectively. Moreover, the study found that 3D Web-based HMI using WebGL contains similar frame time in each frame even though the numbers of cubes are up to ***5***K. This indicated stuttering incurred less in the proposed 3D Web-based HMI compared to the chosen commercial HMI product.
CQ6002	An optimization model for large scale airspace **Tolebi Sailauov** and Z.W. Zhong

16:15pm-16:30pm	*School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore* ***Abstract***—South-East Asia is considered to be one of the fastest traffic growing regions in the world. Due to congested air traffic or bad weather conditions accidents happened in the history. This paper proposes a new mathematical model that finds optimal routes by taking into account delay cost, controller's capacity, departure and arrival capacities of an airport, waypoints capacity, routes capacity, rerouting options by using actual flight paths and considering "fairness" to aircrafts as well. The model can be applied to large scale airspace like ASEAN airspace.
D09 **16:30pm-16:45pm**	Intelligent Transportation Control based on Proactive Complex Event Processing **Yongheng Wang**, Shaofeng Geng and Qian Li *Hunan University, China* ***Abstract*—**Complex Event Processing (CEP) has become the key part of Internet of Things (IoT). Proactive CEP can predict future system states and execute some actions to avoid unwanted states which brings new hope to intelligent transportation control. In this paper, we propose a proactive CEP architecture and method for intelligent transportation control. Based on basic CEP technology and predictive analytic technology, a networked distributed Markov decision processes model with predicting states is proposed as sequential decision model. A Q-learning method is proposed for this model. The experimental evaluations show that this method works well when used to control congestion in in intelligent transportation systems.
MT058 **16:45pm-17:00pm**	Batch Processing Metode in Machine to Machine Wireless Communication as Smart and Intelligent System **Nurul Hiron**, Asep Andang, Hatib Setiawan *Universitas Siliwangi, Indonesia* ***Abstract*—**This study discusses the performance of wireless communication between machines as smart and intelligent systems. The research involves the host-node as a receiver of capture temperature sensing and humidity sensors as sensor-nodes. The purpose of this study is the evaluation of the wireless communication performance as sensor-node sending data to the host in different distance between the sensor to the host-node by implementation batch processing methode. In this research involves batch processing methods as management of digital data transmission in microprocessor ATMega. Using the ZigBeeIEEE 802.15.4 as communication protocol, and the temperature sensors and humidity sensor useing DHT2. In communications test, with the condition without any obstacles between sensor nodes to a host node. found that, at a distance of 18 meters, wireless data communications obtained by the successful delivery of data of 100%. While at a distance of 58.18 meters to send data success rate decreased to 95% and at a distance of 107m success rate of sending data down to only 69%. This study illustrates that, batch processing method only guarantee the security of data sent, but does not affect the quality of wireless communication between machines.at a distance of 107 meters transmit data rate of success is 69%. *Index Terms*—Batch processing, wireless, intelligent system

RE04 **17:00pm-17:15pm**	Automated Scheduling Technique based on Multiple Timer Interrupts for Time-Triggered Co-operative Architecture **S. Kuankid** and A. Aurasopon *Nakhon Pathom Rajabhat University, Thailand* ***Abstract***—Time-triggered system provides more attractive options for many safety-related and safety-critical embedded systems. The work is mainly concerned with developing novel scheduling algorithms and implementation techniques which can be automated and ensured predictability during the process of time-triggered co-operative architecture. The major objective of this work is to modify an automated scheduling technique for use with time-triggered co-operative based on the employment of multiple timer interrupts. The results show that proposed algorithm provides the effective schedulability and can help in a significant reduction of scheduling time as compared with a traditional scheduler. ***Index Terms***—Time-triggered architecture, Time-triggered co-operative scheduler, Multiple timer interrupts
R101 **17:15pm-17:30pm**	The Challenges and Opportunities for the Development of Thailand Railway Network **Ploywarin Sangsomboon1** and Song Yan *Beihang University, China* ***Abstract***—as railway playing more important effective in the country's economic development, each country pays more attention to the development of railway construction. Thai and other Asian country are cooperating more often with each other which will provide great opportunity and challenge for Thailand's railway development. Basis on status of Thailand's railway network, the paper analyzed the possible difficulties and problems which may be encountered in railway development and offered relevant solutions which can serve as guidance to Thailand's railway network development. To meet the needs of the new railway network construction, Thailand has taken a variety of measures to train relevant railway talents. ***Index Terms***—Thailand railway, One Belt and One Road, Railway talents
Starting from 19:00 PM	**Dinner Time**

Please note that during your poster session, he author should stay by your poster paper to explain and discuss your paper with visiting delegates.

POSTER PRESENTATION

< *Mechanical Engineering Section*> / 14:45 pm -15:15 pm

MT063

Microstructure and Wear Resistance of Hard-facing Weld Metal on JIS-S50C Carbon Steel in Agricultural Machine Parts

Kittipong Kimapong, Pramote Poonayom, and Voraya Wattanajitsiri
Rajamangala University of Technology Thanyaburi, THAILAND

Keywords: shielded metal arc welding, hard-facing, buffering, wear, hardness, microstructure,

Abstract. Hard-facing welding is one of the repairing methods for increasing hard metal on the agricultural machine part surfaces that caused by the wear mechanism. To this date, the investigation of an optimized welding process parameter that could produce high hardness and wear resistance of the hard-facing layer is still being developed and performed. This paper aims to study the effects of hard-facing welding layer on mechanical properties and microstructure of hard-facing weld metal on JIS-50C carbon steel. The summarized results are as follows: (a) an increase of hard-facing layer affected to increase the hardness of the layer, (b) the hardness of the welds showed a maximum hardness of about 750 HV at a top surface of 3rd welds layers with no-buffering layer and showed the minimum hardness of about 225 HV at a base metal, (c) microstructure investigation showed that the increase of the phase that contained higher chromium, molybdenum and manganese affected the increase of the hardness and the wear resistance of the weld metal, (d) The minimum mass loss of 0.2559 mg/m could be found when a welding current of 100A, non-buffering layer and 3 layers of hard-facing weld metal were applied, and (e) the buffering layer was able to produce a sound weld metal and might not be suited for the hard-facing welding of the medium carbon steel because it produced the dilution effect that deteriorated the mechanical properties of the weld metal.

MT2005-P

Study on the Diffusion Behavior of Al-Si Coated Layer When Applied Induction heating for hot stamping process

Jaeseong Kim, Seongyong Park, Wonik Eom And Jangsoo Kim
Institute for Advanced Engineering, South Korea

Keywords: Induction heating, 22MnB5, Diffusion, Al-Si, Coated steel

Abstract. An applied hot stamping process on the automobile structural components has been used by due to the demand for reduced vehicle weight, improved safety and crashworthiness qualities. Generally, the hot stamping process currently exists in two different main variants: the direct and the indirect hot stamping method. In the direct hot stamping process, a blank is heated up in a furnace, transferred to the press and subsequently formed and quenched in the closed tool. The indirect hot stamping process is characterized by the use of a nearly complete cold pre-formed part which is subjected only to a quenching and calibration operation in the press after austenitization. The research on the induction heating method for the hot stamping process was performed by increasing the demand for the hot stamped components of vehicle. Induction heating is the process of heating an electrically conducting object by electromagnetic induction, where eddy currents are generated within the metal

	and resistance leads to Joule heating of the metal. So, benefit of the induction heating is a rapidly heating for the metal such as thin sheet. But, the Al–Si-coated layer of the boron steel sheet, which is used in order to prevent scaling of the components of the vehicle during hot stamp forming, was aggregated on the surface by rapidly heating during induction heating. This phenomenon results in the low quality on the surface of the hot stamped component. In this study, the transformation of the coating layer for spread of the aggregated Al-Si coating layer was controlled by induction heating temperature and time. Preferentially, the quality on the surface after induction heating was performed by the visual test. We were evaluated a tenancy of diffusion using the optical microscope, scanning electron microscope and energy-dispersive X-ray spectroscopy.

POSTER PRESENTATION

< *Nanocomposite materials and thin film technology*> / 15:00pm -15:30 pm

MT016

The Improvement in Mechanical and Thermal Properties of Biodegradable Poly (Butylene Succinate) (PBS) Nanocomposites with Low Loadings of Graphene Oxide (XGO)

Achanai Buasri, Udon Kampichit, Panupong Salacharoen, Pouvadon Sangsawee and Vorrada Loryuenyong

Silpakorn University, Thailand

Keywords: Poly (butylene succinate); Graphene oxide; Nanocomposites; Biomaterials

Abstract. This research aims to study the physical, mechanical and thermal properties of poly(butylene succinate)/graphene oxide (PBS/XGO) nanocomposites. The polymer nanocomposites were successfully prepared by solution processing in conjunction with compression molding at various contents of XGO from 0-1.0 wt%. The structure, tensile properties and thermal stability of materials have been investigated by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), scanning electron microscopy (SEM), transmission electron microscopy (TEM), mechanical test, and thermogravimetric analysis. The results revealed that PBS and XGO could mix with each other homogeneously, and uniform dispersion of XGO in the PBS matrix occurred when the filler content was less than 1.0 wt%. Young′s modulus and degradation temperature (T_d) of biopolymer were greatly improved by the addition of a small amount of XGO (1.0 wt%). The nanocomposites have potential application as packing materials.

MT032

Effect of Anodizing Voltage on Anodic Titanium Dioxide (ATO) Growth Based on an Ethylene Glycol Solution Containing NH4F

Chayangkoon Mangkornkarn, Benjarong Samransuksamer, Mati Horprathum, Pitak Eiamchai, Apiluck Eiad-Ua and Korakot Onlaor

King Mongkut's Institute of Technology Ladkrabang, Thailand

Keywords: Titanium dioxide, TiO_2, Anodization, NH_4F, Thin film

Abstract. We reported on the influence of applied voltage on the surface morphology of anodic titanium dioxide (ATO) thin films. At first, titanium (Ti) thin films were prepared by DC-magnetron sputtering for use as a base material in the anodization process. The titanium dioxide (TiO_2) nanoporous ATO was fabricated by the anodization process from the Ti thin film, with different applied voltages from 20 V to 60 V in an electrolyte based on an ethylene glycol containing NH_4F. Pore size distribution of ATO thin films can be varied from 20-50 nm by increasing the applied voltage, while the thickness of the film also increases. In addition, to observe the effect of time, the optimal condition of anodizing voltage was studied by increasing the anodizing time. The results clearly showed the nanoporous ATO over the films and the thickness of the nanoporous ATO is approximately 260 nm.

MT057

Nano-Porous Anodic Aluminum Oxide (AAO) Thin Film Fabrication with Low-Grade Aluminium

Peerawith Sumtong, Apiluck Eiad-Ua and Khattiya Chalapat
King Mongkut's Institute of Technology Ladkrabang, Thailand

Keywords: Aluminum Oxide, Anodic Aluminum Oxide (AAO), Nanoporous Materials, Anodization, Nano-Filters, Nanomaterials, Nanoelectronics

Abstract. Anodic aluminum oxide (AAO) is well known for its nanoscopic structures and its applications in microfluidics, sensors and nanoelectronics. The pore density, the pore diameter, and the interpore distance of an AAO substrate can be controlled by varying anodization process conditions. In this research, the self-organized two-step anodization is carried out with a low-grade (Al6061) aluminium substrate using a 40V voltage at the temperature of 2 to 5 ℃. Three experiments are done with the anodization time of 24 hours, 48 hours and 72 hours. The structural features of AAO are characterized by a field emission electron microscope (FE-SEM). The data from FE-SEM show that the average pore diameter increases with the anodization time, and that the Al6061 aluminium substrate can be used to fabricate a nanoporous AAO film with an average pore diameter smaller than 17 nanometers.

MT083

Characterization of Bismuth Vanadate Nanopowder Prepared by Microwave Method

Pusit Pookmanee, Prakasit Intaphong, Jitrephan Phanmalee, Wiyong Kangwansupamonkon, and Sukon Phanichphant
Maejo University, Thailand

Keyword: Bismuth vanadate, microwave method, X-ray diffraction, scanning electron microscopy, energy dispersive X-ray spectroscopy

Abstract. Bismuth vanadate ($Bi_2VO_{5.5}$) nanopowder was prepared by microwave method at 500 Watt for 2, 4 and 6 min. Bismuth nitrate pentahydrate ($Bi(NO_3)_3 \cdot 5H_2O$) and ammonium vanadate (NH_4VO_3) were used as the starting precursors with mole ratio of 2:1. The phase of $Bi_2VO_{5.5}$ nanopowder was characterized by X-ray diffraction (XRD). The morphology of $Bi_2VO_{5.5}$ nanopowder was investigated by scanning electron microscopy (SEM). The chemical composition of $Bi_2VO_{5.5}$ nanopowder was determined by energy dispersive X-ray spectroscopy (EDXS). The functional groups of $Bi_2VO_{5.5}$ nanopowder was identified by fourier transform infrared spectroscopy (FTIR).

POSTER PRESENTATION

< *Metal Processing and Ceramic* > / 15:30pm -16:00 pm

MT026

Electrical Properties of modified BNT based Lead-free Ceramics

Supalak Manotham, Pharatree Jaita, Pichitchai Butnoi, Ratabongkot Sanjoom, Denis Russell Sweatman, Pongthep Arkornsakul, Tawee Tunkasiri and Gobwute Rujijanagul

Chiang Mai University, Thailand

Keywords: BNT, Lead-free, Electrical Properties.

Abstract. The properties of modified $Bi_{0.5}Na_{0.5}TiO_3$ (BNT) based lead-free ceramics were investigated. The BNT-based ceramics were prepared by a solid-state mixed oxide method Phase formation was determined by X-ray diffraction technique (XRD). The X-ray diffraction analysis of the ceramics suggested that all samples exhibited a perovskite structure without second phase. The value of dielectric constant increased with increasing in sintering temperature. Moreover, high sintering temperatures could improve ferroelectric properties of BNT base lead-free ceramics.

MT027

Fabrication and Properties of Mullite Ceramics from Ranong kaolin

Narumon Lertcumfu, Sukum Eitssayeam, Kamonpan pengpat, Tawee Tunkasiri, Denis Russell Sweatman, Pharatree Jaita , Kachaporn Sanjoom and Gobwute Rujijanagul

Chiang Mai University, Thailand

Keywords: Kaolin, Mullite, Dielectric, Electrical insulation

Abstract. In the present study, mullite powders were prepared from fired Ranong kaolin powder at high temperatures. Differential thermal analyses and X-ray diffraction (XRD) technique were used to understand kaolin–mullite reaction sequence and phase formation of the starting material after a heat treatment, respectively. It was found that phase of mullite started to occure at ~1000 °C. Microstrural study by a scanning microscope, indicated that there was a change in microsture after the heat treatment, i.e. grain shape changed from equiaxed to needle grains shape . The AC conductivity decreased with decreasing the sintering temperature and 1500 °C ceramic presented a very high frequency stabilty of conductivity, suggesting that this martial can be used as an electrical insulator for wide frequency range.

MT031

Influence of Sintering Temperature on Electrical Properties of Modified-PZT Piezoelectric Ceramics

Pharatree Jaita, Ratabongkot Sanjoom, Denis Russell Sweatman, Chatchai Kruea-In, Tawee Tunkasiri and Gobwute Rujijanagul

Chiang Mai University, Thailand

Keywords: sintering temperature; mechanical; dielectric; ferroelectric; piezoelectric.

Abstract. In this research, the effects of sintering temperature on phase structure, densification, microstructure, mechanical and electrical properties of modified-PZT

	ceramics were investigated. All ceramics were prepared by a conventional mixed oxide amend sintered at various temperatures from 1150 - 1250°C. XRD pattern indicated that completely solid solution occurred for all samples and the ceramics exhibited a single perovskite without any secondary phases. At lower sintering temperature, the dominant phase was rhombohedral while tetragonal phase became dominant at higher temperature. Grain size tended to increase with increasing sintering temperature. The dielectric, ferroelectric and piezoelectric properties were also increased with increasing sintering temperature. In addition, the highest low field d_{33} of 620 pC/N of was observed for the 1250°C sample.
MT034	Synthesis of Carbon-supported Metal Catalysts by HTC and Electroplating Processes from Cattail Flower Wachiraporn Gunpum, Kajornsak Faungnawakij, Nawin Viriya-empikul and Apiluck Eiad-ua *College of Nanotechnology, King Mongkut's Institute of Technology Ladkrabang, Thailand* **Keywords:** Conductive carbon pellet, Carbon-supported metal catalyst, Cattail Flower, Hydrothermal Carbonization, Electroplating. **Abstract.** Carbon-supported metal (nickel) catalysts has been synthesized from Cattail flower (CF) by two stage processes: hydrothermal carbonization (HTC) and electroplating technique. In the first stage, CF has been transformed in the HTC process with optimized condition at 180°C for 8h. Then the samples have been compressed into the 5 mm-pellet and calcined under nitrogen atmosphere at 900°C for 2 h to active-surface carbon which produced high surface area and good conductivity. In the second stage, the products obtained from HTC were subjected to produce the carbon-supported metal catalysts. Due to the good electrical conductivity of the carbon from HTC process, the metal can be effectively deposited on the carbon surface. Various parameters such as temperature of solution (40-60°C) and voltage (3.0-5.0V) have been studied. The results indicated that the electroplating process of solution temperature 50°C under applied voltages at 4.0V were the optimal conditions produced to mostly metallic phase.

POSTER PRESENTATION

< *Mechanical Engineering Section*> / 15:30 pm -16:00pm

MT012

Adsorption of Direct Red 80 Dye from Solution by Sugarcane Bagasse and Modified Sugarcane Bagasse as Adsorbents

Phatthraporn En-Oon, Ponsuparat Sansunon and Kowit Piyamongkala
King Mongkut's University of Technology North Bangkok, Thailand

Keywords: Adsorption, Direct Red 80, Modified Sugarcane Bagasse

Abstract. The sugarcane bagasse and modified sugarcane bagasse with 1.0 M H_2SO_4 were used as adsorbents for removal of the direct red 80 in batch adsorption process. The effect on the initial concentration of the direct red 80, at 215.8 - 1028.9 mg/L, was thoroughly investigated in batch adsorption system. It was fount that the point of zero charge of sugarcane bagasse and modified sugarcane bagasse were pH 4.9 and 2.0, respectively. The adsorption capacity increased with initial concentration of direct red 80. The experimental results showed that adsorption capacity onto 1.0 g of sugarcane bagasse and modified sugarcane bagasse for direct red 80 initial concentration 1,028.9 mg/L were 4.2 and 28.9 mg/g, respectively. The Langmuir and Freundlich adsorption isotherms were applied to describe the direct red 80 uptake, which could be described by Langmuir isotherm onto both adsorbents.

MT036

Fantastic Carbon Material for Nickel/carbon Support Catalyst Reducing via Calcination Enhanced with Hydrothermal Carbonization

Buntita Jomhataikool, Wachiraporn Gunpum , Wasawat Kraithong, Nawin Viriya-empikul and Apiluck Eiad-ua
King mongkut's institute of technology ladkrabang, Thailand

Keywords: Carbon Supported, Metal Catalyst, Nickel, Cattail Flower, Hydrothermal, Carbonization, Impregnation.

Abstract. In generally, the metal catalyst which synthesis by conventional techniques is usually in metal oxide form or easily oxidize in the air thus the metal catalyst must reduce to metallic form before using. It was complex process and dangerous. In the research, Carbon material from cattail flower (CF) were used as supporter of Nickel/Carbon supported metal catalyst (Ni/C). This research were studied effect of used carbon material from CF as supporter of Ni/C and varying nickel loading. The Ni/C catalyst were prepared by hydrothermal, impregnation and calcination process. Firstly, Dried CF has been pretreat via hydrothermal process with optimized condition at 180°C for 8h. Then, the nickel solution was added to support via impregnation method by varying Ni loading from 20 to 60 wt% of supported. Finally, the sample has been pelleted into 0.5mm-Ni/C pellet and calcined at 900°C for 2h under nitrogen atmosphere. Ni/C were characterized by x-ray diffraction (XRD), scanning electron microscopy (SEM), Energy dispersive X-ray (EDX), surface area and pore size distribution was determined by N2 adsorption. The result indicate that nickel particle on Ni/C were in the free metal from without reduction and well dispersed on supported surface. Particle size and surface area of Ni/C were decreases at the increase metal loading. Nickel/Carbon supported metal catalyst were ready to use and could be controlled particle size, surface area and crystallinity by metal loading.

MT043

Effect of Alkaline Activation on Low Grade Natural Kaolin for Synthesis of Zeolite A

Panuruj Asawaworarit, Nuwong Chollacoop, Nawin Viriya-empikul and Apiluck Eiad-ua

King Mongkut's Institute of Technology Ladkrabang (KMITL), Thailand

Keywords: Kaolin, Zeolite A, Hydrothermal, Alkaline activation

Abstract. The conventional technique to synthesizes zeolite A from kaolin is calcination. However, this technique has one drawback since, the impurities in kaolin, such as muscovite and quartz, remain. Therefore, the hydrothermal process without calcination is used to synthesize high purity zeolite A. Hydrothermal synthesis without calcination can be separated into two steps, namely first and second hydrothermal steps. Alkaline activation reaction in the first hydrothermal step was used to study the effect of NaOH concentration ranging from 4M, 6M, 8M, 10M to 12M at 200℃ for 3 hours. In this step, sodium aluminosilicate (cancrinite and nepheline hydrate) was produced and then dissolved in HCl. After filtration, the impurity was removed, and adjusted for neutral pH of 7 to form amorphous aluminosilicate gel. For the second hydrothermal step, amorphous gel was mixed with NaOH (1-4M) to form zeolite A at 90℃ for 3 days. The x-ray diffraction (XRD) and Scanning Electron Microscope (SEM) were used for characterization.

MT049

Characterization of Diatomite, Leonardite and Pumice

Atit Wannawek, Pusit Pookmanee, Sakchai Satienperakul, Ratchadapon Putharod, Nattapol Laorodphan and Sukon Phanichphant

Maejo University, Thailand

Keywords: Diatomite, leonardite, pumice

Abstract. This research studies compositions of diatomite, leonardite and pumice for utilization appropriate to the properties of materials. Chemical compositions of these materials were characterized by X–ray fluorescence spectrometry (XRF) and energy dispersive X–ray spectrometry (EDXS). The silica was major component of these materials. The morphology was investigated by scanning electron microscopy (SEM). Diatomite was cylindrical in shape, leonardite was sheet or flake in shape and pumicewas prismatic in shape. The structure was studied by X–ray diffraction (XRD). It was found that the mineral composition of diatomite, leonardite and pumice showed cristobalite low, quartz and anorthite, respectively. The functional groups were identified by Fourier transform infraredspectrometry (FTIR). The functional group of siloxane was obtained and dominated vibration in these materials. And the vibration of carboxylic, alcoholic and carbonyl groups were obtained in leonardite.

MT075

TiO2 Powder Synthesized via the Solvothermal Method and Enhanced Photocatalytic Degradation of Methomyl

Pongthep Jansanthea, Weerasak Chomkitichai, Jiraporn Ketwaraporn, Pusit Pookmanee, and Sukon Phanichphant

Uttaradit Rajabhat University, Thailand

Keywords: TiO_2, solvothermal method, photocatalytic, methomyl, rate constant

Abstract. TiO_2 powder was synthesized *via* the solvothermal method and characterized by X-ray dirraction (XRD), scanning electron microscopy (SEM) and

	energy dispersive spectroscopy (EDS). Single phase anatase was obtained without calcination steps. The particle was irregular in shape with average particle size of 1.0 μm. The characteristic X–ray radiation of element was show titanium at 4.510 keV and 4.931 keV and oxygen at 0.523 keV. The photocatalytic degradation of methomyl in aqueous solution over TiO_2 powder under UV irradiation was determined by UV-Vis spectroscopy. The influence of amount of TiO_2 powder for photocatalytic degradation of methomyl and rate constant were determined. The optimum condition for photocatalytic degradation of methomyl over TiO_2 powder was obtained at 0.05 $g.L^{-1}$ for the amount of TiO_2 powder in 60 min. The degradation rate constant at the optimum condition was 0.0243 min^{-1}.
MT096	Effects of Dental Implant-abutment Interfaces on the Reliability of Implant Systems Xiao Zhang, Lei Liu, Yaling Wang, Xianshuai Chen *Shenzhen Institutes of Advanced Technology, China* **Keywords:** Dental implant; FEA; Implant-abutment connection interface; Fatigue test **Abstract:** In this paper, by analyzing the effects of two different kinds of implant-abutment connection interfaces under the same working condition on the mechanical and fatigue performances of the implant system as well as on the surrounding bones, we intend to study such effects on the reliability of the implants and provide a theoretical basis for the design and clinical application of dental implant systems. For the purpose, we adopt a 3-D modeling method to establish the model, and use FEA (finite element analysis) to carry out static mechanic and fatigue analysis on the implant system and its surrounding bones; then we make the two implant systems, and carry out fatigue tests on a dynamic fatigue testing machine to verify the FEA results. After comparing the results from the two different systems, we find that the stress distribution and fatigue safety factor of the system which has deeper axial matching of the taper connection are better than those of the other system, that is to say, between the two major elements of a implant system, the axial length of the connecting taper and the size of the hexagon, the former has greater effects than the latter. When the axial matching is deeper, the stress distribution of the implant system will be better, the fatigue safety factor will be higher, and the implant system will be more reliable.
MT3001	Modeling of Electron Leakage Current in Undoped Cylindrical Surrounding-Gate MOSFETs Christoforus Bimo, Fatimah A. Noor, and Khairurrijal *Institut Teknologi Bandung, Indonesia* **Keywords:** Gate Tunneling Current, Cylindridal Surrounding-Gate MOSFETs, Compact Model. **Abstract.** Explicit compact model for electron leakage current in cylindrical surrounding-gate MOSFETs is presented. The model began with a quadratic approximation for the quantum electrostatic potential and then analytical form of two lowest energy levels was derived by using quantum perturbation theory. This model took into account both structural and electrical confinement effects therefore it is excellent to describe small diameter device. A good match with self-consistent Schrödinger-Poisson simulation shows that this compact model is suitable to be used in the context of circuit simulator.

MT3002-P	Aluminum Oxide Coating on Fe based Catalyst Support by Micro Arc Oxidation Process Hyunseok Yang, Dae-Hwan Jang, Chul-Han Song, and Mansik Kong *Institute for Advanced Engineering, South Korea* **Keywords:** Aluminum oxide, FeCrAl, Catalyst support, Micro arc oxidation **Abstract.** Steam Methane Reforming (SMR) process is hydrogen gas production process using methane and steam for energy saving. Ceramic pellets are usually used as commercial catalyst in SMR reactor, has severe endothermic reaction depend on mass transfer resistance. However, this ceramic pellet has low heat transfer and geometric surface area, so SMR reactor performance such as pressure, thermal shock resistance, and volumetric efficiency is decreased. For solving these problems, porous metal has developed as catalyst because of high heat transfer, geometric surface area, and superior mechanical properties. FeCrAl is general Ni-Al2O3 catalyst support because of its mechanical properties, though many studies have been tried to overcome FeCrAl-Al2O3 interface adhesion problem by thermal expansion between FeCrAl and ceramic catalyst. Micro arc oxidation process is representative method to have alumina oxide layer on FeCrAl. In this study micro arc oxidation was carried out on open cell structured FeCrAl metal foam with voltage and oxidation time parameter for coating oxide layer, and the formed oxide layer was observed by FE-SEM and EDS for optimizing micro arc oxidation process.

Monday, May 16, 2016 – Optional One day Tour

Please contact conference secretary or staff on site to register or know more information.

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Presentation Speech Quick Review

Session One - Materials Science and Application- Section A

Inthanin Room (Morning Part 11:10am-12:25pm / Afternoon Part 14:00pm-15:30pm)

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MT030	Effects of Zno Addition On Fe2o3/Al2o3 Oxygen Carriers on Ch4 Reduction for Chemical Looping Combustion
MT042	An Effect of Friction Bonding Parameters to Delamination Defect
MT044	Microstructure Change in ASSAB 760 Steel during Cementation and Quenching Process
MT076	Effect of duty ratio at different pulse frequency during hole drilling in ceramics using electrochemical discharge machining
MT077	Analysis of Material Removal in WEDM Operation on E0300 Alloy Steel through Channel Coding
MT086	Compressive Strength Development Of High Strength High Volume Fly Ash Concrete By Using Local Material
MT087-P	Measurement of Streaming Potential in Monitoring Alkaline-Surfactant-Polymer Flooding
MT089	Gas Atomizer Making to Produce Tin Powders
MT095	Effects of Hydroxyapatite/Silk Fibroin/Chitosan Ratio on Physical Properties of Scaffold for Tissue Engineering Application
MT105	Effect of Different Photovoltaic Material on Energetic and Exergetic Performance of Photovoltaic Thermal Arrays
MT1001-P	Magnetic and electrical properties of double perovskite La2-xCaxCoMnO6

Session TWO - Materials Science and Application – Section B

Fai-kham Room (Morning Part 11:10am-12:25pm / Afternoon Part 14:00pm-15:00pm)

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MT024	Defect Reduction in the CO2 Laser Cutting of Glassware Rim
MT051	An Effect of Process Parameters to Anodic Thickness in Hard Anodizing Process
MT053	The Study of Physical and Optical Properties of Barium Borophosphate Glasses
MT064	Comparative Studies of the Light Yield Non-proportionality and Energy Resolution of CsI(Tl), LYSO and BGO Scintillation Crystals
MT067	Total and Partial Photon Interactions of $BaSO_4$-Na_2O-B_2O_3-SiO_2 Glass System
MT085	Influence on fatigue and biomechanics of cone fit of dental implant around the surrounding bone tissue
MT100	Cohesion Improvement of Sand by Bio-cementation Process and Hemp Fiber
MT103	A Review of Arc Brazing Process and Its Application in Automotive
MT2001-P	Shaping of Dense Electrolyte Film For Anode-Supported SOFC using Electrophoretic Deposition Technique

Session THREE - Metal Processing and Ceramic Technology

Buathong Room (Morning Part 11:10am-12:25pm / Afternoon Part 13:30pm-15:30pm)

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MT019	Welding Repair of Aluminium Alloy 6082 T6 by TIG Welding Process
MT020	Improvement of Welding Repair Aluminium alloy 6082T6 by MIG Welding Process
MT028	Effect of Alloying Elements on the Hardness Property of 90% Copper-10% Nickel Alloy
MT038	Electrical Properties of BNKTZ Ceramics as a Function of Calcination Temperature
MT040	Effect of Electrode on Electrical and Ferroelectric Behavior of Modified BNT Lead-Free Ceramics

MT054	Effect of High-Frequency Microwaves on The Microhardness of Alumina Ceramic
MT059	Effect of Water Flow Direction on Cut Features in the Laser Milling of Titanium Alloy under a Water Layer
MT060	Study on the Performance of Orthodontic Self-drilling Correction Screw of Ti6Al4V and Stainless 316L
MT061	Characteristics of Machining Parameters on WEDM Titanium Alloy
MT069	Direct Measurements of Magnetocaloric Effect in a Single Crystalline Ni2.13Mn0.81Ga1.06 Heusler Alloy
MT088	Thermal and Physical Properties of White-opaque Sanitary Glazes using Lampang Pottery Stone as Raw Materials
MT090	Effect of Porosity on Residual Stress of 2024-Aluminum GTAW Specimen
MT098	Effect of Precipitate on Microstructure Evolution and Hardness of Al-Cu Alloy during Torsion Deformation

Session FOUR - Nanocomposite Materials and Thin Film Technology

Fai-kham Room (15:15pm-18:15pm) ● **Page 29-33**

MT017	Preparation of Zeolite Nanocrystals via Hydrothermal and Solvothermal Synthesis using of Rice Husk Ash and Metakaolin
MT055	Effects of TEOS Precursor and Reaction Time on the Synthesis of Silica Coated Single-Walled Carbon Nanotubes
MT056	Impedance Spectroscopic Inspection toward Sensitivity Enhancement of Ag-doped WO3 Nanofiber-based Carbon Monoxide Gas Sensor
MT094	Preparation and Characterization of Bionanocomposite Films Made from Carrageenan, Beeswax and ZnO Nanoparticles
MT097	Physico-Mechanical Properties of Starch-based Nanocomposite Film Incorporated with Hydrothermally Synthesized Zinc Oxide Nanoparticles
MT1002-P	Properties of CuInS2 Nano-particles on TiO2 by Spray Pyrolysis for Solar Cell
MT2003-P	Growth and in-situ Annealing of Initial Layer in Bi2Te3 Epi-layers by Molecular Beam Epitaxy
MT2004-P	Growth of Ga2O3 Films on (0001) Sapphire Substrates using in-situ GaN-buffer layer by Plasma Assisted Molecular Beam Epitaxy
MT2007-P	Research on the preparation, biocompatibility and bioactivity of magnesium matrix hydroxyapatite biological composite material*

Session FIVE - Mechanical Engineering

Fai-kham Room (15:15pm-18:15pm) ● **Page 34-38**

D202	Early estimation of work contents for planning the one-of-a-kind production by the example of shipbuilding
D203	Design of an agricultural robotic platform with omni-directional motion
MT007	Life Extension of Propeller Shafts by Hardfacing Welding
MT045	Study on Effect of Process Parameters on End Wear of Tool Electrode during Planetary EDM of Ti-6Al-4V
MT046	Application of Radial Tool Movement in Electrical Discharge Machining Process for Boring Operation
MT092	Failure Analysis of Hydraulic Rotary Drill Rods in a Limestone Mine
MT093	Alternative Optical Acquisition Technique for Supporting Reverse Engineering Process
MT106	A Determination of Optimal Feed Rate and Work-pieces Coating on Two Spray Booths and Continuously Feeding to an Oven
RE02	Fatigue Life Assessment of Weld Surfacing of LB 52 Solid Wire on SCM 440 Alloys Steel Propeller Shafts
RE06	A robust one-class support vector machine using Gaussian-based penalty factor and its application to fault detection
RE07	Optimization of Plasma Spray Process VIA Orthogonal Test Design Method, SVM, and Improved PSO
RE10	A Maintenance Time Measurement Methodology under the Combination of Ergonomics and Virtual Simulation

Session SIX - Computer Science and Intelligent Transportation

Buathong Room (15:45pm-17:30pm) ● **Page 39-41**

D07	Rule-Based Storytelling Text-to-Speech (TTS) Synthesis
CQ6002	An optimization model for large scale airspace
D02	3D Web-based HMI with WebGL Rendering Performance
D09	Intelligent Transportation Control based on Proactive Complex Event Processing
MT058	Batch Processing Metode in Machine to Machine Wireless Communication as Smart and Intelligent System
RE04	Automated scheduling technique based on multiple timer interrupts for time-triggered co-operative architecture
RE101	The Challenges and Opportunities for the Development of Thailand Railway Network

Poster Presentation ● Page 42-51

MT012	Adsorption of Direct Red 80 Dye from Solution by Sugarcane Bagasse and Modified Sugarcane Bagasse as Adsorbents
MT075	TiO2 Powder Synthesized via the Solvothermal Method and Enhanced Photocatalytic Degradation of Methomyl
MT027	Fabrication and Properties of Mullite Ceramics from Ranong kaolin
MT031	Influence of Sintering Temperature on Electrical Properties of Modified-PZT Piezoelectric Ceramics
MT3001	Modeling of Electron Leakage Current in Undoped Cylindrical Surrounding-Gate MOSFETs
MT3002-A	Aluminum Oxide Coating on Fe based Catalyst Support by Micro Arc Oxidation Process
MT026	Electrical Properties of modified BNT based Lead-free Ceramics
MT016	The Improvement in Mechanical and Thermal Properties of Biodegradable Poly (Butylene Succinate) (PBS) Nanocomposites with Low Loadings of Graphene Oxide (XGO)
MT036	Fantastic Carbon Material for Nickel/carbon Support Catalyst Reducing via Calcination Enhanced with Hydrothermal Carbonization
MT034	Synthesis of Carbon-supported Metal Catalysts by HTC and Electroplating Processes from Cattail Flower
MT043	Effect of Alkaline Activation on Low Grade Natural Kaolin for Synthesis of Zeolite A
MT032	Effect of Anodizing Voltage on Anodic Titanium Dioxide (ATO) Growth Based on an Ethylene Glycol Solution Containing NH4F
MT057	Nano-Porous Anodic Aluminum Oxide (AAO) Thin Film Fabrication with Low-Grade Aluminium
MT063	Microstructure and Wear Resistance of Hard-facing Weld Metal on JIS-S50C Carbon Steel in Agricultural Machine Parts
MT049	Characterization of Diatomite, Leonardite and Pumice
MT083	Characterization of Bismuth Vanadate Nanopowder Prepared by Microwave Method
MT096	Effects of Dental Implant-abutment Interfaces on the Reliability of Implant Systems
MT2005-P	Study on the Diffusion Behavior of Al-Si Coated Layer When Applied Induction heating for hot stamping process

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2016 International Conference on Intelligent Materials and Nanomaterials (ICIMN 2016) will be held in **Mexico City** during **August 16-18, 2016**, which is supported by **National Autonomous University of Mexico (NAUM).**

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