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Part I　Conference Schedule

Time: January 3-5, 2019
Location: International Asia-Pacific Convention Center Sanya
三亚亚太国际会议中心

Date	Time	Lobby	
Jan. 3	14:00-17:00	Registration	
Date	**Time**	**Seoul Room (汉城厅)**	**HongKong Room(香港厅)**
Jan. 4	08:30-12:00	**Materials Science & Technology** **Invited Speech Session 1:** **Chair:** **Group photo & Coffee Break: 10:00-10:15**	**Computer Science & Communications** **Invited Speech Session 1:** **Chair: Prof. Vinay Sharma** **Group photo & Coffee Break: 10:00-10:15**
	12:00-13:30	Lunch	Pacific Cafe（太平洋咖啡厅）
Date	**Time**	**Seoul Room (汉城厅)**	**HongKong Room(香港厅)**
Jan. 4	14:00-18:00	**Materials Science & Technology** **Invited Speech Session 2:** **Chair: Prof. King-Chuen Lin** **Group photo & Coffee Break: 16:15-16:30**	**Computer Science & Communications** **Invited Speech Session 2 & Technical Session 1:** **Chair: Prof. Guangwei Hu** **Group photo & Coffee Break: 16:15-16:30**
	18:00-19:30	Dinner	Pacific Cafe（太平洋咖啡厅）
Date	**Time**	**Seoul Room (汉城厅)**	**HongKong Room(香港厅)**
Jan. 5	08:30-12:00	**Materials Science & Technology** **Invited Speech Session 3 &** **Technical Session:** **Chair: Prof. Miran Mozetič** **Group photo & Coffee Break:** **10:00-10:15**	**Computer Science & Communications** **Technical Session 2:** **Chair:** **Group photo & Coffee Break:** **10:00-10:15**
	12:00-13:30	Lunch	Pacific Cafe（太平洋咖啡厅）

Part II Invited Speech

Materials Science & Technology: Invited Speech Session 1

Invited Speech 1: Efficient and selective synthesis of phenol by direct oxidation of benzene with molecular oxygen in sub-nano spaces and development of sub-nanotech for 3E production of phenol

Speaker: Prof. Linsheng Wang, National Institute for Materials Science, Japan
Time: 08:30-09:15, Friday Morning, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Phenol is an important intermediate for the manufacture of fine chemicals and engineering plastics utilized in many commodities, which is produced mainly by the three steps so-called cumene process via the decomposition step of cumene hydroperoxide intermedi ate with sulfuric acid to an equimolar acetone production besides phenol in a liquid phase. Compared to the cumene process, direct phenol synthesis from benzene in a one-step gas-phase reaction is highly desirable for industry, and various oxidants have been examined for the direct benzene-to-phenol synthesis. The development of new gas-phase heterogeneous catalytic systems is of great significance from the viewpoints of both fundamental research and industrial applications. In the present presentation, Pt, Ir, Ni based clusters are fabricated in the sub-nano pores of ZSM-5 and beta zeolites as the novel efficient catalysts for the selective benzene-to-phenol process. It has been found that the selective oxidation catalysis of zeolite β-supported Ir , Pt and Ni catalysts for the gas-phase phenol synthesis of benzene with O2 under coexisting NH3, whereas in their bicomponent systems (benzene+O2 or NH3+O2) benzene and NH3 were deeply oxidized with O2 to CO2 and N2, respectively. However, in the three component reactions, benzene was oxidized to phenol selectively (up to 93.1% selec.), where the switchover of the reaction pathways from the combustion to the selective oxidation occurred and the combustion of both benzene and NH3 was remarkably suppressed. The active structure of fabricated nano-catalysts and the reaction mechanism for the novel benzene-to-phenol process were identified by characterization with XAFS, STEM/EDS, XRD, XRF, XPS, DFT, etc. The novel alternating process involving benzene-O2-NH3 and benzene-H2O processes was also developed for the selective phenol synthesis from benzene with O2, in which the phenol selectivity was maximized and the ammonia consumption was minimized. In the novel alternating benzene-to-phenol process, about 99% phenol selectivity with negligible ammonia consumption have been achieved. Based on the above laboratory experimental results, a novel 3E (ecologic, economic and environmentally-friendly) industry process for phenol production from benzene with air can be expected in the near future.

Invited Speech 2: Numerical evaluation of the effect of the used activator on the formation of the microporous structure of the activated carbons

Speaker: Dr. Mirosław Kwiatkowski, AGH University of Science and Technology, Poland
Time: 09:15-10:00, Friday Morning, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Microporous carbonaceous materials and the adsorption processes taking place on their surface have been the object of widespread research and application. In particular these materials are used to rid the air of substances that are harmful to human health, including for protection from poisonous substances and for environmental protection in the processes of removing harmful substances from waste gases. The porous structure and functional properties of carbonaceous adsorbents are dependent on the structure of the original raw material. As a consequence, the choice of suitable material is no less important than the selection of adequate production method and the determination of optimum process conditions. Therefore, a search for new raw materials that would be useful in the production of carbonaceous adsorbents has been under way, and particular attention has been paid in this regard to biomass waste from food and timber industries and agriculture. The work presents numerical evaluation of the effect of the used activator and the raw material on the formation of the microporous structure of the activated carbons. The numerical calculations were carried out based on of the adsorption isotherms of nitrogen taken from literature. On the basis of the research and analyses, a significant effect of the type of the activating agent used as well as the raw material on the formation of the porous structure and, consequently, on the adsorptive properties of the produced activated carbons were observed. The new proposed method provides a wider spectrum of information on the analyzed porous structure of the activated carbons and the processes occurring on their surface, what provides a unique tool enabling a precise characterization of the structure of the carbonaceous microporous materials, and this in turn makes it possible to optimize the processes of their manufacture.

Invited Speech 3: Study of triazine-based dendrimers with C3 symmetry or breaking their C2 symmetry as Mesogenes

Speaker: Dr. Long-Li Lai, National Chi Nan University, Chinese Taipei
Time: 10:15-11:00, Friday Morning, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Dendrimers, generally consisting of central and linking moieties as well as peripheral groups in spheroid or globular packings are noteworthy because these molecules with well-defined chemical structures, often show interesting and predictable properties and thus have attracted a lot of intention in recent decades. Due to their varied architectures and multiple functions in one single molecule, these molecules in the fields of catalysts, drug-carriers, photoelectric materials, and porous materials have been extensively investigated.
Dendrimers that exhibit columnar liquid crystalline (LC) phases have also been found useful in photovoltaics and field transistors7 because of their non-grained boundary and uniform alignment in the solid state. However, the molecular conformations of dendrimers are versatile and it is not easy to control molecular shapes due to their various combinations of cores, linking units, and peripheral functionalities. The LC phases of traditional dendrimers, containing flexible spacers and mesogenic units, are generally induced by the mesogenic moieties. Instead of traditional LC dendrimers, we are devoted in the study of unconventional triazine-based LC dendrimers that contain rigid cores, rigid linkages, and flexible peripheral chains. Such dendriemrs with C2 symmetry may exhibit mesogenic phases on thermal treatment only in high molecular weight. On the application point of view, dendrimers with lower molecular weight that can exhibit mesogenic phases on thermal treatment is necessary. Therefore, preparing dendrimers with C3 symmetry or breaking their C2 symmetry is worthwhile to study further.

Invited Speech 4: Artificial microstructures in oriented films of LPE-processed Y123 for fundamental researches and device application

Speaker: Prof. Yao Xin, Shanghai Jiao Tong University, China
Time: 11:00-11:45, Friday Morning, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia -Pacific Convention Center Sanya

Abstract
Different microstructures of high temperature superconductor (HTS) suit for different applications. For instance, c-axis orientated YBa2Cu3O7-δ (YEBCO)

films are appropriate for current transport approach, while a-axis oriented films are suitable for device applications. Besides, grain boundaries (GBs) with a special structure are of great potential to improve superconducting performance. Thus, it is of significant importance to realize artificial control of film microstructures. Among numerous preparation methods, the liquid phase epitaxy (LPE) technique has many advantages with respect to the film growth, such as high crystalline quality, low cost, high growth rate and so on. Over the years, we have been making efforts in the field of the artificial control of film microstructures for LPE-processed YBCO by tuning solute supersaturation state. The main scientific significance of this presentation is to interpret the nature of oriented film growth, to introduce several novel approaches for effective control the supersaturation state in solution with a wide range from low, intermediate to high levels, to reliably prepare a variety of oriented microstructures for potential applications. Through the work presented here, we hope to provide specific guidance for orientation control of REBa2Cu3O7-δ (RE = rare earth element) films, and the preparation of some distinctive GBs.

Invited Speech 5: Preparation, characterization and potential applications of polymers with biomimetic surface structures

Speaker: Prof. Jui-Ming Yeh, Chung Yuan Christian University, Chinese Taipei
Time: 11:45-12:30, Friday Morning, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia -Pacific Convention Center Sanya

Abstract
In this work, polymers with biomimetic surface structures were fabricated by nano-casting technique with poly(dimethyl siloxane) (PDMS) as soft negative template to perform the pattern transfer from surface structures of natural leaf to polymer surface. The as-prepared polymers with biomimetic surface structures were found to exhibit super-hydrophobicity as well as high surface area, which can be potentially applied in the research field of anticorrosion coating and supercapacitor.

Materials Science & Technology: Invited Speech Session 2

Invited Speech 6: Synthesis and Characterization of Nanomaterials in Applications of Sensing and Catalysis

Speaker: Prof. King-Chuen Lin, National Taiwan University, China
Time: 14:00-14:40, Friday Afternoon, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Palladium nanoparticles (Pd NPs) immobilized on a garlic skin-derived activated carbons (GACs) was synthesized. The morphology, structure, surface compositions, and textural properties of the GACs and Pd@GAC catalyst were examined by a variety of physicochemical characterization techniques which revealed a dispersion of Pd NPs with average particle size of ca. 21 nm on sheet-like graphitized GACs. The Pd@GAC catalyst, which can be facilely prepared with biowaste feedstocks, exhibited excellent catalytic performances for efficient reduction of Cr(VI) with extraordinary stability and recyclability over at least five repeated catalytic test cycles.
Further, we present ultra-sensitive sensing of a prostate-specific antigen (PSA), which is used as a biomarker to detect prostate cancer, using a molybdenum series (MoO3, MoS2, and MoSe2) of two-dimensional nanosheets (2D NSs). The design of a 2D NS-based PSA aptamer sensor system was demonstrated based on a fluorescence turn-on mechanism in the presence of a target. The detection limit of PSA was achieved to be 13 pM for MoO3 NSs, whereas the MoS2 and MoSe2 systems exhibited a detection limit of 72 and 157 pM, respectively. The in vitro bioimaging measurements were also performed using confocal fluorescence microscopy. Herein, PSA detection was successfully demonstrated in human embryonic kidney 293T (HEK) live cells. Moreover, the MoO3, MoS2, and MoSe2 NSs exhibit excellent biocompatibility and low toxicity; thus, these 2D NSs can be used as a promising sensor platform to detect prostate cancer.

Invited Speech 7: Application of photocatalyst on fibrous materials

Speaker: Dr. Jinfeng Wang, Deakin University, Australia
Time: 14:40-15:20, Friday Afternoon, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
The current rapid industrial development causes the serious energy and

environmental crises. Photocatalyst provide a potential strategy to solve these problems because these materials not only can directly convert solar energy into usable or storable energy resources but also can decompose organic pollutants under solar-light irradiation. This talk will cover our investigation on the synthesis-structure-property relationship of semiconductor metal oxide, in order to develop high performance and easy recycling materials for practical application, which include pollutant detection, water and air pollutant treatment. The ultimate goal is to be able to develop semiconductor photocatalyst for energy conversion and environmental applications.

Invited Speech 8: Electronic Structures and Energy Applications of Layered Materials

Speaker: Prof. Hong Seok Kang, Jeonju University, Republic of Korea
Time: 15:20-16:00, Friday Afternoon, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Based on a combination of various first-principles methods, we propose various kinds of layered materials. One is tetragonal GeP2, which has optimal band offset for photocatalyzed CO2 decomposition at wide pH range. The second one TeSe2, which exhibits phase polymorphism and interesting spin texture depending upon the presence or absence of centrosymmetry. Others are orthorhombic BP3 and hexagonal GeX (X=P,As), which are charactierized by high carrier mobility and high interlayer Li diffusion rate, respectively. I also describe my recent collaborations with an experimental group. First, combined experimental and theoretical effort is described for an efficient photoelectrochemical (PEC) water splitting of p-GeAs/n-Si heterojunction based on the band alignment, buildup of space charge in the junction, and the band bending of the n-Si at the electrolyte interface. Second, our extensive DFT calculation complemented by analyses of charge transfer, band structure analyses, and Volmer-Heyrovsky reactions give a deep insight into our experimental results, which has shown that the 1T'-phase guest-intercalated MoS2 nanosheets synthesized by one-step hydrothermal reaction exhibit excellent stability as well as higher catalytic activity toward the hydrogen evolution reaction. Finally, our extensive ab initio molecular dynamics simulations not only reproduce collaborative experimental voltage-charge capacity curves for WS2@graphite and WS2@nitrogen-doped graphite composites in lithium ion battery but also gives us a detailed picture on the structural evolution in the charge-discharge process.

Invited Speech 9: Recent Advances in Surface Modification of Magnesium Alloys

Speaker: Prof. Guosong Wu, Hohai University, China
Time: 16:10-16:50, Friday Afternoon, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract

Magnesium alloys are very attractive in the aerospace,transport, and biomedical industry. Their applications can reduce environment pollution and fuel consumption in automobile and aerospace industriesbecause they are one of the lightest structural materials. Magnesium alloys have been considered biodegradable metals due to theirnatural biodegradation and Young's modulus similar to that of human bones. However, they always suffer from severe corrosion or rapid degradation. Thus, it is very necessary to mitigate their corrosion or degradation in their actual applications. We have proposed a new strategy in our studies for corrosion mitigation of magnesium alloy. Hydrothermal treatment,ion implantationandsputtering are applied to modify the surface based on the concept of predesigned corrosion. In this invited talk, our recent research activities will be described.

Invited Speech 10: Low-voltage Oxide Transistors for Brain-Inspired Neuromorphic Device Applications

Speaker: Prof. Li Qiang Zhu, Chinese Academy of Sciences, China
Time: 16:50-17:30, Friday Afternoon, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract

Brain-inspired neuromorphic engineering is becoming a hot topic in the field of information technology. Designing artificial synapses that could emulate essential synaptic plasticities is of great importance for hardware implementation of neuromorphic engineering. Ionic-liquid and ionic-gel electrolyte gated transistors (EGTs) exhibit short-term and long-term changes in channel conductivities. Thus, such devices have strong potential applications in brain-inspired artificial synapse devices and neuromorphic systems. In this talk, recent progresses in our group will be discussed. New achievements will be presented, including the fabrication of low-voltage oxide electric-double-layer transistors, the realization of synaptic responses in the oxide synaptic transistor and the learning abilities for the devices. Moreover, the device demonstrates potential applications in Hodgkin–Huxley artificial synaptic membrane.

Invited Speech 11: Understanding Deformation Mechanisms in Advanced Nanostructured Materials by Multiscale Modeling

Speaker: Prof. Caizhi Zhou, Department of Materials Science and Engineering, Missouri University of Science and Technology, Rolla, MO 65409, USA
Time: 17:30-18:10, Friday Afternoon, January 4, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract

Advanced metallic nanostructured materials, such as metallic nanolayered composites, nanotwinned metals and gradient nano-grained materials, have drawn increased attention in the past decade because of their ultrahigh strength, increased ductility and elevated fracture toughness. Fundamental barriers must be resolved to manufacture such advanced nanostructured materials in bulk form and at reduced cost. Significant research has been conducted in recent years to understand the underlying mechanisms that control the mechanical behavior of these advanced nanostructured materials. Both experiments and modeling have revealed that as microstructure length-scales are reduced from micrometer- to nanometer levels, interfaces, such as grain boundaries and phase boundaries, become crucial in determining the mechanical behavior of nanostructured materials. Through the development of computer resources and novel experimental methods, macroscopic and phenomenological descriptions of mechanical behaviors are being substituted by multiscale approaches rooted in deeper understanding of microstructure- and defect-level processes during the deformation. Challenges remain in developing models with truly predictive capability in applications to nanostructured materials.This talk will review various modeling tools at different length scales and present a new hierarchical multiscale modeling framework to study mechanical behavior of nanostructured materials and provide a scientific basis for design and processing advanced materials with superior properties.

Materials Science & Technology: Invited Speech Session 3

Invited Speech 12: Plastic Flow of Polymers Near Rough Walls

Speaker: Dr. Sergei Alexandrov, Beihang University, China
Time: 08:30-09:10, Saturday Morning, January 5, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract

The main objective of the present paper is to investigate, by means of a

boundary value problem permitting a semi-analytic solution, qualitative behaviour of solutions for two pressure-dependent yield criteria used for plastically incompressible polymers. The study mainly focuses on the regime of friction (sticking and sliding). It is shown that the existence of the solution satisfying the regime of sticking depends on other boundary conditions. In particular, there is such a class of boundary conditions depending on the yield criterion adopted that the regime of sliding is required for the existence of the solution independently of the friction law. The boundary value problem considered consists of a planar deformation comprising the simultaneous shearing and expansion/contraction of a hollow cylindrical specimen of material. This problem is an ideal benchmark problem for understanding qualitative features of solution behaviour in the vicinity of frictional interfaces. Therefore, in the present paper this boundary value problem is used in conjunction with two yield criteria proposed for polymers elsewhere.

It is shown that:

1. In the case of expansion of the cylinder, the solution satisfying the regime of sticking at the inner radius exists independently of the other boundary conditions for both yield criteria considered in the present paper.
2. In the case of contraction of the cylinder obeying both yield criteria, the solution satisfying the regime of sticking does not exist if the ratio of the circumferential velocity at the outer radius to the radial velocity of the inner radius is large enough. However, there are qualitative differences in the conditions that controls the non-existence of solution. The qualitative features of solutions found can be used to develop a new approach for predicting the generation of skin layers.

Invited Speech 13: Polyolefin Catalyst: Design, Modulation and Application

Speaker: Dr. Shengyu Dai, Anhui University, China
Time: 09:10-09:50, Saturday Morning, January 5, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract

In the past 50 years, the studies of olefin polymerization have achieved great successes in both academia and industry. Polyolefins have huge annual production and wide applications. However, one of their biggest limitations is their nonpolar nature. The introduction of a small amount of polar functionalized groups can greatly improve many properties, broaden their applications and increase their business values. Transition metal catalyzed copolymerizations of olefin with polar monomers is the most direct route to access polar functionalized polyolefins, which is also highly challenging. With the “polar monomer problem” as the central theme, this account mainly focuses the works from our research group and describes the following topics: modification of existing catalyst systems, development of new catalyst systems, design of new polymerization modulation strategies, and the synthesis and property studies of special polyolefins and polar functionalized polyolefins materials.

Invited Speech 14: Polymeric and Dendritic Materials for Organic Light-Emitting Diodes

Speaker: Dr. Liu Di, Dalian University of Technology, China
Time: 09:50-10:30, Saturday Morning, January 5, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Following the conventional organic small molecules that are suitable for vacuum evaporation, polymers and dendrimers are solution-processible light-emitting materials that are used in organic light-emitting diodes (OLEDs).1 Solution processibility is a precious merit for OLED materials due to the features of simpleness, low cost, and suitability for large scale production. Dendrimers possess exact molecular structures like small molecules, which is favorable to guarantee the high repeatability and good performance. However, they usually suffer from the complicated syntheses especially when the generation is high. Polymers are not only solution processible, but also possibly prepared via one-step reaction procedure by mixing all the necessary reagents. But polymers are sometimes troubled by poor purity and repeatability. For both dendrimers and polymers used as OLEDs functional materials, smart molecule designing are necessary to tune and balance their optoelectronic parameters and thus to optimize their performance in OLEDs. In this lecture, various kinds of dendrimers and polymers developed in the authors' group for OLEDs application will be presented,2,3 with the focus on those use as light-emitters and charge-transporting hosts. For the light-emitting dendrimers, non-doping feature and the site-isolation effect on the emissive core will be the major issues in the process of molecular designing. For the dendritic host materials, the molecular configuration-property-device performance relationships will be mainly discussed. For light-emitting polymers, their applications as bipolar charge-transporting hosts and solution-processed thermal activated delayed fluorescence emitters will be focused.

Invited Speech 15: Haemo-compatibility of heart valves coated with carbon nanowalls

Speaker: Prof. Miran Mozetič, Jozef Stefan Institute, Slovenia
Time: 10:40-11:20, Saturday Morning, January 5, 2019
Location: Seoul Room (汉城厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
A method for depositing carbon nanowalls upon non-equilibrium gaseous

plasma conditions will be presented. The deposition was performed in a low-pressure plasma reactor which allows for a high quality of vertically oriented carbon nanowalls by taking advantage of the PECVD method. The samples were then incubated with human blood in order to monitor hemostatic response. Blood platelets soon activated on the surface of untreated substrates whereas the activation was negligible on the surface of artificial heart valves coated with carbon nanowalls. The concentration of activated blood platelets on the surface of samples coated with nanowalls was almost three orders of magnitude lower than on uncoated substrates, what was explained by a minimal contact area between platelets and the surface of the coated heart valve. The technique represents an interesting alternative to classical technologies for suppressing haemostatic response of cardiovascular implants.

Computer Science & Communications: Invited Speech Session 1

Invited Speech 1: Recent Progress in the Application of Terahertz Spectroscopy and Imaging for the Detection of Agricultural Products and Food

Speaker: Prof. Lijuan Xie, Zhejiang University, China
Time: 08:30-09:00, Friday Morning, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
To meet the increasing demand for high levels of safety and quality in agricultural products and food, state-of-the-art analytical techniques are required both during and after production. Terahertz technology, including terahertz spectroscopy and imaging, is gaining more and more attention due to its superiority of non-ionizing, fingerprint spectrum, and transient, which has proved to be a promising non-destructive tool for both qualitative and quantitative measurement in various fields. In this study, some typical terahertz spectroscopy and imaging systems are summarized. Importantly,recent technical applications of terahertz spectroscopy and imaging for identification and classification, location, safety control, and quality inspection in agricultural products and food are reviewed. The challenges and outlook of terahertz spectroscopy and imaging in agriculture and food fields are also discussed.

Keywords
Terahertz spectroscopy, terahertz imaging, agriculture, food, safety, quality

Invited Speech 2: Artificial Intelligence + Microwave Wireless Radio-Free Harmless Charging System

Speaker: Prof. Haiping Chen, AMERICA P & G CO.
Time: 09:00-09:20, Friday Morning, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Artificial Intelligence + Microwave Wireless Charging System Technology" is a long-standing dream of mankind. People try to use electromagnetic induction, electromagnetic resonance, radio wave and other principles for wireless charging. Among them, electromagnetic induction technology is the most widely used and mature technology. Other wireless charging technology is still in the experimental stage. There are still many technical problems unsolved, which is far from practical application. After many years of development and promotion, electromagnetic induction technology has not been widely accepted by the market and consumers because of its low energy conversion efficiency (average 40-70%), heat affecting battery life, generating a large number of electromagnetic radiation health risks, large components and not easy to implant, etc., and the market of wireless charging technology has not been as expected.

This project "Artificial Intelligence + Microwave Wireless Charging System Technology" will transmit electric energy to terminal electronics by ultra-low frequency pulsed electric field for wireless charging. The four main stages of the "Artificial Intelligence + Microwave Wireless Charging System Technology" have completed the basic working principles and procedures of pulse signal detection, step current pulse start-up, ultra-low frequency pulse electric field transmission and gentle slope pulse shutdown.

Invited Speech 3: Over-the-Air Testing: from 4G Terminals to 5G MmWave Base Stations

Speaker: Prof. Xiaoming Chen, School of Electronic and Information Engineering, Xi'an Jiaotong University, Xi'an, China
Time: 09:20-10:05, Friday Morning, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
In the fourth generation (4G) communications, over-the-air (OTA) testing is mainly used for performance evaluation of long term evolution (LTE) user equipment (UE), because the characteristics of the internal antennas of the UE are generally unknown or not accessible. The 4G base station (BS), on the other hand, has well defined antenna ports. Hence, the BS antennas are

usually measured separately, whereas the BS without antennas is usually evaluated by conductive testing. Popular 4G multiple-input multiple-output (MIMO) OTA testing methods for LTE UEs are multi-probe anechoic chamber (MPAC), radiated two-stage method (RTS), and reverberation chamber (RC). Throughput is chosen as the performance metric for 4G MIMO-OTA testing. However, different MIMO-OTA methods and even different laboratories of the same MIMO-OTA method usually give results with noticeable differences. A generalized MIMO-OTA throughput model can greatly facilitate the MIMO-OTA harmonization work that is ongoing in the 3rd generation partnership project (3GPP) standardization. In this invited talk, we will compare the pros and cons of different MIMO-OTA methods, with a special focus on their adaptability to 5G millimeter-wave (mmWave) OTA testing. A modified version of the MPAC method is presented as a promising solution for OTA testing of 5G mmWave devices with adaptive beamforming. MmWave OTA performances and open problems are discussed in the presnetation.

Invited Speech 4: FinTech disruption and financial services innovation: a big data analytics perspective

Speaker: Prof. Zongwei Luo, Southern University of Science and Technology, China
Time: 10:20-11:05, Friday Morning, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
Today's financial industry has been undergoing major transformation due to fast technology development in AI, Blockchain and Big data analytics. Driven by massive data availability and advancement in data analytics, FinTech disruption to financial industry is inevitable. In this talk, we will present FinTech disruption and financial services innovation from big data analytics perspective.

Invited Speech 5: The Scenariors and Implematation of the Value Co-Creation in E-Gov Service

Speaker: Prof. Guangwei Hu, Nanjing University, China
Time: 11:05-11:50, Friday Morning, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

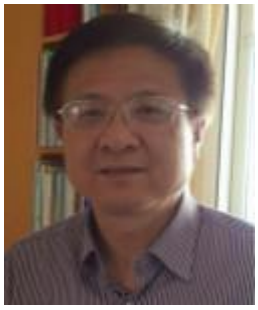
Abstract
The wide acceptability of ICTs and social media enriches the delivery platform of e-gov services (EGS). EGS is an important interaction and collaboration channel between the government and the public. The public can conveniently and timely explore problems, provide ideas, and design solutions to improve EGS. The roles of the public changed to active, informed partners or co-creators of EGS innovation and problem solving. This study builds the influence factor model on public engaging intention of value co-creation for EGS based on technology acceptance theory, trust theory, and motivation theory to explore impact factors and impact paths. Path analysis interpreted how the public would accept and adopt value co-creation behavior for EGS. This study also introduced a comprehensive picture of the new paradigm of public service value creation in an era of increasing user dominance, that is, the public.

Invited Speech 6: The Acquisition of Free Will and Intelligence

Speaker: Prof. Hengjin Cai, Executive Director of Zall Institute of Research, Professor of School of Computer Science, Wuhan University
Time: 11:50-12:35, Friday Morning, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
The universe runs according to physicallaws, but it canevolve in different directions for the varieties of saddle points in its phase space. Therefore, a free will can play a role in the choice of directions. A lifeform can bisect and encapsulate the universeinto Self and Outside World by its physical boundaries. Homo Sapiens acquired sensitive tactilityin the biological evolutionand consequentlyare active players in the physical world. Their intelligences are entangled with subjective biases, in stark contrast to algorithmic computing of machines.

Invited Speech 7: Overview of Terahertz CMOS Frequency Generators



Speaker: Prof. Luhong Mao, School of Electrical and Information Engineering, Tianjin University, China
Time: 14:00-14:45, Friday Afternoon, January 4, 2019
Location: Hongkong Room（香港厅), 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya

Abstract
The terahertz (THz) frequency band (100 GHz ~ 10 THz) has drawn increasing attention because of its wide band for high data rate communication applications and the high resolution for radar systems. As the continuous device scaling, signals in THz frequency band can be generated in CMOS processes. Due to the poor quality factor of the passive devices and the deteriorated transistors' performance at such high frequency, it is difficult to obtain wide tuning range, low phase noise, high output power simultaneously. The parasitics of the transistors can be reduced by the optimized layouts. Some novel structures are used in both the passive and active parts to improve the oscillation frequency and extend the tuning range. Some frequency multiplication technologies are proposed to reduce the frequency of the oscillators, such as push-push topologies and linear superposition technique. The representative related researches are reviewed and summarized to provide some references and inspire the future work.

Part III Technical Sessions

Materials Science & Technology: Technical Session

Session Chair: Prof. Miran Mozetič, Jozef Stefan Institute, Slovenia

Seoul Room (汉城厅), 3rd Floor, Conference Building 08:30-12:00, Saturday Morning, January 5, 2019

ID	Paper Title	Author	Affiliation
Invited Speech 08:30-09:10	Plastic Flow of Polymers Near Rough Walls	Dr. Sergei Alexandrov	Beihang University, China
Invited Speech 09:10-09:50	Polyolefin Catalyst: Design, Modulation and Application	Dr. Shengyu Dai	Anhui University, China
Invited Speech 09:50-10:30	Polymeric and Dendritic Materials for Organic Light-Emitting Diodes	Dr. Liu Di	Dalian University of Technology, China
10:30-10:40	**Coffee Break**		
Invited Speech 10:40-11:20	Haemo-compatibility of heart valves coated with carbon nanowalls	Prof. Miran Mozetič	Jozef Stefan Institute, Slovenia
11:20-11:30	A Study on Electric Properties of CFRP for Automotive Applications	Sultan Alkhteeb	Nippon Institute of Technology
11:30-11:40	The Characteristic Research of Component Strength for Connecting End Frame Structures of ACM	Zhiyong Tan	Beijing Institute of Nearspace Vehicle's Systems
11:40-11:50	The research of acoustic emission(AE) characteristics for C/SiC composite structure under combination of heating and mechanical loading	Changwan Min	Beijing Institute of Nearspace Vehicle's Systems
11:50-12:00	The influence of secondary building linker geometry on photochromism of naphthalenediimide based metal-organic frameworks	Hai yu Wang	Northeast normnal university
12:00-12:10	The effect of the homogenization annealing on microstructure and corrosion resistance of a sandwich multi-layers brazing sheets	Zhipeng Yuan	Southeast University

12:10-12:20	Atomistic interaction between Si and Mn at the ferrite/cementite interface in high-carbon steel	Linghui Huang	Southeast University
12:20-12:30	Synthesis of Rice-Ear-Shaped Cu Dendrites and Novel Die Attach Technology Using Rapid Sintering of the Dendrites	Jong-Hyun Lee	Seoul National University of Science and Technology
12:30-12:40	Quantum dot light-emitting diodes based on all-inorganic perovskiteCsPbX3	Jizhong Song	Nanjing University of Science & Technology
12:40-12:50	Study on the reused slags in steelmaking processes	Weite Wu	National Chung Hsing University
Poster	Fabrication of metal–organic frameworks based on Ru(bpy) 32+- Cr101@sio2 complex and its electrochemiluminescence application	Jing Xu	Hubei University of Medicine
	Nanocomposite film of mxene(Ti3C2) with high mechanical strength and better conductivity	Yan Li	Material science and Engineering department of Beihang university

Computer Science & Communications: Technical Session 1

Session Chair: Prof. Guangwei Hu, Nanjing University, China

HongKong Room(香港厅), 3rd Floor, Conference Building 14:00-18:00, Friday Afternoon, January 4, 2019

ID	Paper Title	Author	Affiliation
Invited Speech 14:00-14:45	Overview of Terahertz CMOS Frequency Generators	Prof. Luhong Mao	Tianjin University, China
14:45-15:05	Development of Identification Tags Using Terahertz Waves	Shosaku Kimura	Nagoya University
15:05-15:25	Terahertz pulse generation using prism-coupled Cherenkov phase matching with organic nonlinear optical crystals	Kengo Oota	Nagoya University
15:25-15:45	Spectroscopy of methane hydrate using terahertz waves	Keisuke Matsumura	Engeneering, Nagoya University
15:45-16:05	Terahertz (THz) spectroscopy-based	Vinay Sharma	NIIT University,

	probing of hydration dynamics of transition metal and rare-earth halides in aqueous phase		Neemrana - 301705, Rajasthan, India
16:05-16:20	**Coffee Break**		
16:20-16:40	An inversion transformation of feeding waveform and field distribution on NEMP simulator	Zhou Heng	Northwest Institute of Nuclear Technology, Xi'an, China
16:40-17:00			
17:00-17:20			
17:20-17:40			

Computer Science & Communications: Technical Session 2

Session Chair:

HongKong Room(香港厅), 3rd Floor, Conference Building 08:30-12:00, Saturday Morning, January 5, 2019

ID	Paper Title	Author	Affiliation
08:30-08:45	Prediction of Solar Radiation using Data Clustering and Time-delay Neural Network	Chee Keong Chan	Nanyang Technological University, Singapore
08:45-09:00	Tile Type Multi-channel Transceiver Module Applied for Phased Array Antenna	Taifu zhou	chengdu
09:00-09:15	The Echo Modelling and Simulation of the Semi-active Radar Seeker against a Sea Skimming Target	Peng Peng	Xidian University
09:15-09:30	An Effective Cleaning Procedure to Minimize the Error for Terahertz Attenuated Total Reflection	Yuxin Huang	College of Biosystems Engineering and Food Science, Zhejiang University
09:30-09:45	Study of Terahertz Polarization Effect of Water Confined Inside Carbon Nanotubes	Ruiqian Wang	Zhejiang University
09:45-10:00	Enhanced sensitivity in THz sensing with	Ruiyun Zhou	Zhejiang University

	nanomaterials		
10:00-10:15	**Coffee Break**		
10:15-10:30	Terahertz imaging : a cutting-edge and non-destructive technology	Qi Wang	Zhejiang University
10:30-10:45	The Dynamic Prediction Model of Number of Participants in Software Crowdsourcing Collaboration Development Project	Sun-Jen Huang	National Taiwan University of Science and Technology
10:45-11:00	Big Data in Chinese government governance: analysis of Decision-making Model innovation and practice	Peng Wang	Renmin University of China
11:00-11:15	New Algorithm for Local Shape Preservation T-Spline Surface Skinning	Qinhe Fan	BeiHang University
11:15-11:30 Poster	A Modified Four Path Method for Calculating Coupling Field of Super-low Altitude Aircraft Target	Zou Gao Xiang	Air Force Engineering University
11:30-11:45 Poster	High-Power 30-Element Helical Antenna Array	Yuan Liang	Southwest Jiaotong University

Part IV Technical Sessions Abstracts

Materials Science & Technology

ID: ACM2019_10000
Title: A Study on Electric Properties of CFRP for Automotive Applications
Name: Sultan Alkhteeb
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Abstract:
Carbon fiber reinforced plastic (CFRP) is an extremely strong and light material and going to be used widely for automotive bodies as well as airplanes. Although CFRP is conductive because of the carbon fibers, its conductivity is much lower than that of metals. Therefore, the electric properties of CFRP need to be carefully examined in order to better utilize it for automobiles. The metal bodies, for instance, provide an electric magnetic shield against lightning and electromagnetic waves. Shielding capability of CFRP bodies against lightning, however, is still largely unknown and must be investigated to resolve safety concerns. CFRP plates need to be connected with metal components in automotive bodies. Electric heating is often used for joining CFRP and metals. Thus, characterizing current flows in CFRP is also important for the automotive applications. In this paper, we investigate such electric properties of CFRP as anisotropic resistivity, complex dielectric constant, and breakdown voltage, and relate them to the physical phenomena of high voltage discharging and heat generation. Arago's rotation is used for evaluating the current flow in CFRP that is dependent on the CFRP's fiber orientation, while back-plate discharging is used for showing that the electric filed distribution in CFRP is independent on the fiber structure.

ID: ACM2019_20000
Title: The Characteristic Research of Component Strength for Connecting End Frame Structures of ACM
Name: Zhiyong Tan
Affiliation: Beijing Institute of Nearspace Vehicle's Systems
Email: tanzhy_01@163.com

Abstract:
A new generation of hypersonic vehicles generally adopt C/SiC and C/C as the main bearing forces of thermal structure design engineering an integrated cabin using thin-walled structural members for a large size design[1,2]. So the most important step from material spanning to engineering practical structure is to determine how to effectively guarantee the mechanical properties of components with complex shape and their connection structure. The main load of the aircraft needs transmitting by the connection frame of the thermal structure cabin, which combines complex structural forms and complex stress characteristics and hence they are the bottleneck of composite structure design and mechanical analysis[3,4]. Owing to the complexity of the structure and stress state of the thermal structure connecting end frame made from advanced composite materials(ACM), and the immature theoretical analytical methods, this paper has studied on the component-level mechanical functional properties, illustrated by C/C and C/SiC materials. It carries out different grades of component-level experiments and analyses the weakness of composite thermal structure connecting end frames, including the screw hole pull-out test, the bending test of corner beams, and the corner box test with structural characteristics. The test results and the mechanical properties are summarised, which have a certain reference in the design

of the structure. The bolt hole pulling test and the corner beam bending test primarily examine the
local stress concentration area and the failure form of the connecting bolt. Then, the typical corner
box test has already possessed sufficient characteristics of the end frame structure and can be used
for the mechanical evaluation of replacing the whole cabin structure. Finally, the failure of
different components and the factors that impact the strength of the failures have been obtained
from this research.

ID: ACM2019_20001

Title: The research of acoustic emission(AE) characteristics for C/SiC composite structure under combination of heating and mechanical loading

Name: Changwan Min

Affiliation: Beijing Institute of Nearspace Vehicle's Systems

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Abstract:

Recently, carbon fiber reinforced composites materials, such as carbon fiber reinforced SiC (C/SiC) and carbon fiber reinforced C (C/C), have drawn an extensive amount of attentions because of their remarkable combination of various unique properties, such as low density, light weight, high melting point, excellent chemical stability and good thermal shock resistance.

In this paper, the acoustic emission characteristics of C/SiC composite component under various conditions were compared, with the purpose of identifying the possible damage and failure mechanism. During the process of the single mechanical loading, the highest amplitude of the AE signal was less than 85dB and the main damage forms of matrix cracking and interface debonding were involved. For the heating process, high energy AE signals with amplitude more than 85dB were detected and fiber fracture mechanism was determined as well due to the thermal stress caused by the mismatch of the thermal expansion coefficient between the reinforced fiber and matrix. Occasionally, some high energy AE signals with amplitude more than 85dB were detected. During the combination process of the heating and mechanical loading, it was concluded that the degree of damage was much severer than the simple superposition of damage produced by the individual mechanical loading and the individual heating process.

ID: ACM2019_10003

Title: Nanocomposite film of mxene(Ti3C2) with high mechanical strength and better conductivity

Name: Yan Li

Affiliation: Material science and Engineering department of Beihang university

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Abstract:

As a new two-dimensional sheet material, mxene has attracted wide attention since it was exfoliated from MAX in 2011 due to its better water dispersibility and higher conductivity, which is superior to graphene, along with other properties of hydrophilic surface and large specific surface area.so mxene has extensive applications , including energy storage, catalysis and Electromagnetic shielding. Here we report a facile approach to get a new composite material film with mxene (Ti3C2) and Hyaluronic acid (HA) with different ratio in order to enhance the mechanical strength of pure mxene film by 5 times, at the same time, the conductivity of composite film was increased to 7.1×〖10〗^5S⁄m and get better performance in electromagnetic shielding which can be used in the field of electronic equipment or aerospace. Scanning electron microscope (SEM) is used to characterize the composite film to confirm it's a layer by layer structure.

ID: ACM2019_10004

Title: Study on the reused slags in steelmaking processes

Name: Weite Wu

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Abstract:

The purpose of this study is reuse reduction slag and rotary-kiln slag. In contrast to traditional dephosphorizer, which consists 100 % lime. The reduction slag has lower melting point and part of free-CaO, and it help the new dephosphorizer liquefy rapidly and react fully with molten steel. The results show that the dephosphorizer (100 % reduction slag) has dephosphorization ratio 35 %. The dephosphorizer (25 % lime + 75 % reduction slag) has dephosphorization ratio 67 %. The dephosphorizer (50 % lime + 50 % reduction slag) has dephosphorization ratio 69 %. The dephosphorizer (50 % lime + 50 % rotary-kiln slag) has dephosphorization ratio 62 %. The dephosphorizer (100 % lime) has dephosphorization ratio 84 %.

ID: PMS2019_20001

Title: The influence of secondary building linker geometry on photochromism of naphthalenediimide based metal-organic frameworks

Name: Hai yu Wang

Affiliation: Northeast normnal university

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Abstract:

Three novel square grid metal-organic frameworks (MOFs) based on cadmium have been synthesized successfully by analogous solvothermal reactions where reacted N,N'-di(4-pyridylacylamino)-1,4,5,8-naphthalenediimide (IsoNDI) as the predesigned ligand with three kinds aromatic dicarboxylic acids as the secondary building linkers. Geometries of these secondary building linkers have made influence on the formation of photochromism-leading intermolecular interactions in obtained crystal structures. Owing to the existence of NH group in the adopted NDI-type ligand, N-H…O hydrogen bonds are observed between IsoNDI ligands and neighbouring dicarboxyl groups in all compounds. However, face-to-face π-π stacking interactions are only found in compound 1 but not in 2 and 3 for the naphthalene ring possessing larger π-plane in 1 is more likely to form the interactions with π-conjugated planar IsoNDI ligand. Meanwhile, lone pair-π interactions appear in compounds 2 and 3 but not in 1 because their closer packing patterns have tendency to generate such interactions between adjacent IsoNDI ligands. Moreover, three compounds all exhibit interesting reversible photochromic behaviors in the presence of photoinduced electron transfers through above intermolecular interactions. Besides, photo-controlled luminescence properties have been also investigated showing competitive relationship with photochromic behaviors.

ID: SIM2019_20001

Title: Fabrication of metal–organic frameworks based on Ru(bpy) 32+- Cr101@sio2 complex and its electrochemiluminescence application

Name: Jing Xu

Affiliation: Hubei University of Medicine

Email: xujingwh@163.com

Abstract:

Aims: A facile method for fabricating a luminescence-functionalized metal–organic frameworks and its potential application as a sensitive solid-state electrochemiluminescence (ECL) sensor material was studied.

Methods: The process involved the formation of Ru(bpy)32+-Cr101@sio2 complex via effective immobilization of Ru(bpy)32+ within Cr101@sio2 MOFs. Then as prepared complex were attached to the surface of a Pt electrode to form an ECL sensor. The ECL and cyclic voltammetric experiments were performed with a three-electrode electrochemical cell. A platinum wire electrode was used as an auxiliary electrode and the working electrode was a platinum electrode coated with Ru-Cr101@sio2 composite. Characterization of Ru(bpy)32+-Cr101@sio2 composite was accomplished by transmission electron microscopy, X-ray diffraction, X-ray photoelectron spectrum and field emission scanning electron microscope.

Results: The electrochemistry and ECL behavior of Ru(bpy)32+ immobilized on Cr101@sio2 were studied

with tripropylamine as a coreactant. As-prepared Ru(bpy)32+-Cr101@sio2 composite exhibited very good stability and showed excellent ECL behavior.

Conclusions: The as-prepared luminescence-functionalized metal–organic frameworks Ru(bpy)32+ - Cr101@sio2 exhibited great promise as new luminescent materials for solid-state ECL detection.

Acknowledgements: This work was partially supported by the Foundation of Health and Family planning Commission of Hubei Province(WJ2017M215). This work was also financially supported by the Foundation for Innovative Research Team of Hubei University of Medicine(FDFR201602).

ID: SIM2019_10000

Title: The effect of the homogenization annealing on microstructure and corrosion resistance of a sandwich multi-layers brazing sheets

Name: zhipeng Yuan

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Abstract:

The effect of homogenization annealing treatment on the microstructure and corrosion resistance of AA4343/3z23a/AA4343 brazing sheets was studied. The results show that homogenization annealing treatment has a great influence on the microstructure and corrosion resistance. For the homogenization annealing samples, Cu in the core material diffuses to the clad material before brazing. After brazing, the Cu content in the diffusion zone increases significantly. For the non-homogenization annealing samples, band of dense precipitates formed in the diffusion zone during brazing process, which improves the corrosion resistance of the material. Compared with the brazing sheet homogenized at the same thickness, the time for the perforation of the brazing sheet without homogenization is higher.

ID: SIM2019_20003

Title: Atomistic interaction between Si and Mn at the ferrite/cementite interface in high-carbon steel

Name: Linghui Huang

Affiliation: Southeast University

Email: 123jilly@163.com

Abstract:

The atomic interaction among Si, C and Mn at the ferrite-cementite interface is investigated using atom-probe tomography combining first-principle calculations. Two types of high carbon steels with different Si contents are prepared. It is found that Si is enriched at the ferrite side of the interface while Mn is enriched at the cementite side. This interfacial segregation phenomenon gradually diminishes or disappears as the transformation proceed. Moreover, in high Si steel, the partitioning ratio of C and Mn is higher than that in low Si steel, leading to more C and Mn partition into cementite. Based on the results of first-principles calculations, Si atom diffuses from the cementite phase to the ferrite phase in pearlite system results in that the stability of pearlite increases. Meanwhile, due to the strong repulsive force between Si and C/Mn at the interface, enrichment of Si in ferrite promotes the partitioning of C and Mn into cementite.

ID: CN2019_10005

Title: Synthesis of Rice-Ear-Shaped Cu Dendrites and Novel Die Attach Technology Using Rapid Sintering of the Dendrites

Name: Jong-Hyun Lee

Affiliation: Seoul National University of Science and Technology

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Abstract:

Rice-ear-shaped Cu dendritic particles were fabricated through fast galvanic displacement reactions for 3–5 min under ambient conditions by adding Zn particles into a CuSO4 aqueous solution without chloride ions. This novel technique to synthesize the modified dendrites is extremely simple and suitable for mass production. The Cu dendritic particles had a small

average size of 4.44 μm and short, multiple branches that were aggregates of nanoparticles were formed on backbone stems, exhibiting large surface area. The Cu dendrites could be protected against oxidation during drying by post-treatment. While the dendrite stem was a polycrystal grown only on the (111) plane, the branches consisted of three planes (111), (200), and (220), indicating that they were formed by random attachment of nanoparticles and aggregates. The synthesized Cu dendritic particles were made into paste by mixing with α-terpineol, and the paste was used as a bonding material for a die attach process. Average shear strength after the attachment increased with an increase of bonding temperature and time. As a representative result, a sufficient average shear strength of ~17 MPa was measured with the transformation of paste bond-line into dense structure even after the extremely short bonding time of only 1 min when the attachment was performed at 250 oC in air by pressing at 10 MPa throughout the bonding time. The cause that the sinter bonding by Cu dendritic particles was rapid is attributed to the nano-morphology characteristics in surfaces of the particles.

ID: CN2019_20009

Title: Quantum dot light-emitting diodes based on all-inorganic perovskiteCsPbX3

Name: Jizhong Song
Affiliation: Nanjing University of Science & Technology
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Abstract:
Halide perovskites, which have made significant successes in the applications of solar cells, light-emitting diodes, and photodetectors, are showing a great promise as a new generation of emitter materials. In addition to their composition independent optoelectronic properties, these materials in a nanocrystal (NC) form have a high photoluminescence (PL) quantum yields (QYs) of up to 95% and narrow light emitting peak with FWHM of about 20 nm, making them particularly attractive for high quality lightings and displays. Among recently reported perovskite NCs, inorganic perovskite cesium lead halides (CsPbX3, X = Cl, Br, and I) is more promising for practical applications owing to the high thermal stability and low moisture sensitivitycomparison with organic-inorganic hybrid counterparts. Here, I will give a detailed progress on the CsPbX3 QLEDs in our group.

Computer Science & Communications: Technical Session

ID: ICMTT2019_10001

Title: Development of Identification Tags Using Terahertz Waves

Name: Shosaku Kimura
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Abstract:
1. Background and purpose of the experiment
Barcodes and radio frequency identification (RFID) are typical examples of identification technology that brings convenience to our everyday lives. However, there are also issues to be addressed such as the danger of barcode information being leaked and RFID being unable to identify tags in close proximity.

By applying terahertz waves with a suitable level of material permeability to identification technology, we are promoting the development of authentication media that has the features of allowing identification that surpasses obstacles, has a low risk of leaking information, and also has the ability to identify tags in close proximity. In this report, we discuss the results of basic experiments on the identification of color code-shaped tags using the low-cost material PE with a terahertz spectroscopic imaging system.
2. Experiment method and results

In this study, we aim to use color codes with new materials, and create color codes using PE with rust-proofing spray blown on to both sides. The transmission spectrum before and after the spray is shown in Figure 1. Using 1mm、1.5mm、2mm PE after spraying, we created color codes with 3 rows and 3 columns. The method of measurement was to irradiate focused terahertz waves on the central area of the respective PE and measure the transmission identity. As obstacles, we inserted EMS envelopes, and measured every 10GHz from 1.4THz to 1.6THz. The created color codes and identification results are shown in Figure 2. We were able to identify the thickness of the respective PE correctly. From the above results, through the use of rust-proofing spray, we successfully strengthened interference due to multiple reflections, and created color codes using low-cost PE. This promises to lead to the development of extremely low-cost terahertz tags.

ID: ICMTT2019_10002

Title: Terahertz pulse generation using prism-coupled Cherenkov phase matching with organic nonlinear optical crystals

Name: Kengo Oota
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Abstract:
We used organic nonlinear optical crystals to generate terahertz wave pulses using prism-coupled Cherenkov phase matching method.

ID: ICMTT2019_10003

Title: Spectroscopy of methane hydrate using terahertz waves

Name: Keisuke Matsumura
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Abstract:
Attention has focused in recent years on gas hydrates, which consist of hydrogen bonding on water molecules. In particular, the formation of methane hydrate, consisting of water and methane gas, has been confirmed in various parts of the world and is expected to provide a next-generation energy resource; in addition, the properties of gas hydrates mean they can be used to store and separate gases. However, a decomposition mechanism for gas hydrates, including methane hydrate, has not been established. There is a phenomenon called the "self-preservation effect" in methane hydrate, whereby methane hydrate can exist stably for a long time when temperature and pressure conditions are outside the region of equilibrium. Although the critical factor has not been elucidated, there is a hypothesis that supercooled water is involved in the mechanism by which decomposition is suppressed in the self-preservation effect. Several methods have been used to elucidate this decomposition mechanism, and we are conducting research using terahertz time domain spectroscopy (THz-TDS) as a novel method for investigating this phenomenon, because THz waves are sensitive to phase changes in water molecules and show strong absorption in liquid water. Here, we report on a THz study to observe liquid water in the decomposition mechanism of methane hydrate.

ID: ICMTT2019_10004

Title: Terahertz (THz) spectroscopy-based probing of hydration dynamics of transition metal and rare-earth halides in aqueous phase

Name: Vinay Sharma
Affiliation: NIIT University, Neemrana - 301705, Rajasthan, India
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Abstract:
The underlying molecular hydration mechanism of various rare-earth and transition metal halides in aqueous phase is still a point of discussion among various researchers. As an addition to our earlier findings of nickel, manganese and lanthanum halides, we investigated aqueous zinc metal ions in combination

with Cl- and Br- as counter anions using a combined terahertz (THz) narrow band p-Ge laser and broadband THz-FTIR spectroscopy. In theoretical perspective, experimental results were complemented by theoretical hydration modelling. Using these methods, we observed low frequency resonances attributed to various orders of ion complexion. Present results strongly indicate that Terahertz absorption spectroscopy provides significant insights into the ion-hydration mechanism up to the molecular level as well as it has a strong potential to detect ion-paring between cation and anion in aqueous phase.

ID: ICMTT2019_10007

Title: A Modified Four Path Method for Calculating Coupling Field of Super-low Altitude Aircraft Target

Name: Zou Gao Xiang
Affiliation: Air Force Engineering University
Email: gxiangzou@163.com

Abstract:
A novel modified four path method (FPM) is presented for calculating coupling field of super-low altitude aircraft target. Based on the hybrid method PO+MEC (Physical Op-tics and Method of Equivalent Currents), the antenna radiation pattern is introduced to consider the multipath interference from side lobe of seeker. The modified FPM is used to calculate the coupling field from super-low altitude aircraft target above different terrestrial environments. The curves of scattering coefficient are analyzed. The influences of height of target, root mean square (RMS), and incident angle on coupling field characteristics are discussed. The simulation results can be used for reference in detection for super-low altitude target and optimization for radar system.

ID: ICMTT2019_10014

Title: An inversion transformation of feeding waveform and field distribution on NEMP simulator

Name: Zhou Heng
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Abstract:
The paper presents an inverse derivation method for the excitation signal of NEMP simulator and the field distribution near the simulator, and only one field measurement system is needed. Transformation functions from feeding point to arbitrary point have been calculated by the simulator’s external shape and the geometrical relationship between simulator and the ground, then with the waveform measured in one point, the excitation signal of NEMP simulator can be obtained, and the field distribution near the simulator can be depicted.

ID: ICMTT2019_10006

Title: Tile Type Multi-channel Transceiver Module Applied for Phased Array Antenna

Name: taifu zhou
Affiliation: chengdu
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Abstract:
In order to reduce the volume and weight of phase array antenna in RF frequency, an integrated technology of multi-channel transceiver circuit and power division network in microwave is proposed for the tile type TR module. The component is integrated in a same dielectric substrate, the mounting interface of chips and power division network are on the same layer. Finally, a 8×8 array has been manufactured and tested to validate its function. The results show the integrated technology has good performance. It is very good to satisfy the miniaturization and lightweight of the T/R module in the active phased array antenna.

ID: ICMTT2019_10008

Title: The Echo Modelling and Simulation of the Semi-active Radar Seeker against a Sea Skimming Target

Name: Peng Peng
Affiliation: Xidian University
Email: pengpengxidian@163.com

Abstract:
This paper has proposed a new modelling and simulating technique for the echo of the semi-active radar seeker against the sea skimming target. The echo modelling is based on the electromagnetic scattering mechanisms. A modified Four-path model based on the radar detection scene is used to describe the multipath scattering between the target and rough sea surface. A Facet-based Small Slope Approximation (FBSSA) method is employed to calculate the scattering from the sea surface. The Physical Optics (PO) and the Equivalent Edge Current (EEC) Method is used to calculate the target scatter-ing. In the echo simulations. The results present the original echo and the echo pro-cessed by the signal processing procedures, where the clutter and multipath effect can be observed.

ID: ICMTT2019_10010
Title: An Effective Cleaning Procedure to Minimize the Error for Terahertz Attenuated Total Reflection
Name: Yuxin Huang
Affiliation: College of Biosystems Engineering and Food Science, Zhejiang University
Email: yxhuang@zju.edu.cn

Abstract:
Terahertz attenuated total reflection (THz-ATR) spectroscopy has an expected poten-tial on detection of powder, thin film and especially for liquid samples in many tech-nical areas. One of the most important factors affecting reliability of data during THz-ATR spectra collection, especially for quantitative detection of trace amount of analytes, is the cleanliness of the ATR accessory after each measurement. In this study, we proposed an effective cleaning procedure to minimize the error from the residuals after each cleaning. The cleansing conditions of the ATR accessory (cleaning agent, flow velocity, and cleaning time) on THz-ATR detection were investigated through differentiation index, K-means clustering, and Euclidean distance. The results show that ethanol was the best cleaning agent followed by methanol and water. cleaning time and flow velocity both can improve the cleaning efficiency in the given ranges.

ID: ICMTT2019_20001
Title: Study of Terahertz Polarization Effect of Water Confined Inside Carbon Nanotubes
Name: Ruiqian Wang
Affiliation: Zhejiang University
Email: rqwang@zju.edu.cn

Abstract:
The carbon nanotubes (CNTs) are commonly used to perform as ideal linear polarizers in the range of terahertz (THz) frequency based on their extreme anisotropic electric, magnetic, and optical properties. However, there is a possibility of introducing water molecules into CNTs due to preparation and handling issues. Therefore, it is necessary to study the effects of the water molecules confined in CNTs on THz polarization. We first fabricated an aligned single wall CNT film using a filtration process. An anhydrous film was obtained by drying the CNT film to 70 degrees Celsius for 2 hours. Then, the film was immersed in water to prepare a CNT film with water molecules inside CNTs. From Raman spectroscopy, it is evident that the Raman shift moves to a long wavenumber direction after the water molecules was confined in the CNTs, which proves the transition from nonaqueous to hydrated state of CNTs. Finally, a THz polarization experiment was performed to compare THz polarization effects for both dried CNT film and water confined CNT film. The results show that the polarization effects of THz perform better in the dried CNT film than that of CNT film with water molecules. In this case, it is safe to draw a conclusion that the confined water molecules in the CNTs weakened the polarization effect of terahertz.

ID: ICMTT2019_20002

Title: Enhanced sensitivity in THz sensing with nanomaterials

Name: Ruiyun Zhou
Affiliation: Zhejiang University
Email: ryzhou@zju.edu.cn

Abstract:
Terahertz sensing, as a non-destructive, label-free, and non-contact method, has at-tracted wide attention in various fields. However, improving the sensitivity remains a challenge. There has been increasing demand to integrate novel materials with tradi-tional terahertz technology to improve its detection performance. Nanomaterials have been constantly creating possibilities for terahertz technology advancement. Consider-ing the superior characteristics of terahertz detection and the excellent optical and elec-tronic performance of nanomaterials, it is meaningful to integrate nanomaterials with terahertz sensing to improve the sensitivity for wider applications in agricultural and biological field in the future.

ID: ICMTT2019_20003

Title: Terahertz imaging: a cutting-edge and non-destructive technology

Name: Qi Wang
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Abstract:
Due to the characteristics of terahertz radiation, ie., the ability to non-ionize and penetrate non-conductive materials, terahertz imaging is a cutting-edge and non-destructive technology in many fields such as biomedical diagnostics, safety, quality control and many more. Terahertz imaging techniques include THz near-field imaging, THz focal plane imaging with raster scanning or array detectors, THz spectroscopic imaging and THz tomography, digital holography based on THz coherent radiation. However, the main challenge that hinders the widespread use of terahertz imaging is the slow acquisition time of conventional point-by-point raster scans. For further practical application of terahertz imaging technology, there are several problems to be overcome in imaging in terms of speed, spatial resolution and convenience.

ID: CiSE2019_20000

Title: Prediction of Solar Radiation using Data Clustering and Time-delay Neural Network

Name: Chee Keong Chan
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Abstract:
In this paper, a combination of data clustering and artificial intelligence tech-niques are used to predict incoming solar radiation on a daily basis. The data clustering technique known as Perceptually Important Points is proposed, where time-series data is grouped into clusters separated by key characteristic points, which are later used as training data for an artificial neural network. The type of network used is known as a Focused Time-Delay Neural Network, and an analysis of the data is performed using the Mean Absolute Percentage Error scheme.

ID: CiSE2019_20003

Title: The Dynamic Prediction Model of Number of Participants in Software Crowdsourcing Collaboration Development Project

Name: Sun-Jen Huang
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Abstract:
Many online platforms providing crowd with opportunities to participate in software
development projects have been existed for a while. Meanwhile, many enterprises are using
crowdsource to collaboratively develop their software via these platforms in recent years. However,
some software development projects in these platforms

hardly attract users to join. Therefore, these project owners need a way to effectively predict the number of participants in their projects and accordingly well plan their software and project specifications, such as the program language and the size of the documentation, in order to attract more individuals to participant in the projects.

Compared with the past prediction models, our proposed model can dynamically add the factors, such as number of participants in the initial stage of the project, within the project life cycle and make the adjustment to the prediction model. The proposed model was also verified by using cross validation method. The results show that (1) The models with the factor "the number of user participation" is more accurate than the model without it. (2) The factors of crowd dimension are more influential on the prediction accuracy than those of software project and owner dimensions. It is suggested that the project owners not only just consider those factors of the software project dimension in the initial stage of the project life cycle but also those factors of crowd and interaction dimensions in the late stage to attract more participants in their projects.

ID: CCBD2019_10001

Title: Big Data in Chinese government governance: analysis of Decision-making Model innovation and practice

Name: Peng Wang
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Abstract:

The 19th National Congress of the Communist Party of China has put forward higher requirements for Chinese government governance. The government governance has developed to a higher stage. Meanwhile, it faces more challenges, like lacky of top-level design and information sharing. To develop a government governance decision-making innovation model, we should make good use of big data to mine in the grassroots government data management network. Both the characteristics of the times and the experience of the practice have proven that big data can empower government governance and promote the construction of a service-oriented government.

ID: CVCG2019_10003

Title: New Algorithm for Local Shape Preservation T-Spline Surface Skinning

Name: Qinhe Fan
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Abstract:

Surface skinning is a widely used algorithm in CAD modeling which permits designer to pass surface through several section curves, thus providing modeling process with powerful ability to describe complex shapes and transform the 2D design intention into 3D space. This paper contributes in the combination of T-Spline technology and surface skinning modeling by introducing a new algorithm for local shape preservation T-Spline surface skinning. The examples given in the paper show that this algorithm iseffective.

ID: ICMTT2019_10000

Title: High-Power 30-Element Helical Antenna Array

Name: Yuan Liang
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Abstract:

A new radial-line helical array (RLHA) using dual-branch helical antennas has been designed for improving the power capacity of RLHAs. The helical element is cavi-ty-backed to lower the mutual coupling and its power capacity is higher than the con-ventional ones. The components of the proposed array are discussed and the power capacity is obtained by simulation. Compared with the typical RLHAs, the proposed sub-array has not only higher power capacity but also uses fewer elements. Experi-mentally, the

measured results of an array prototype indicate that high gain as well as circular polarization has been successfully achieved.

Part V Instructions for Presentations

Oral Presentation

Devices Provided by the Conference Organizing Committee:

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

Materials Provided by the Presenters:

- PowerPoint or PDF files

Duration of each Presentation:

- Regular Oral Session: 10-15 Minutes of Oral Presentation
- Invited Speech: 40-45 Minutes of Invited Speech

Part VI Hotel Information

About Hotel

International Asia-Pacific Convention Center Sanya is a five star standard luxury hotel, which locates beside the seashore, and is the ideal place for vacation and conference. The hotel has 254 luxury and comfortable rooms, and 16 conference rooms in different sizes. The conference rooms can accommodate people from 20-1000 and totally square 5400m2. Housing, dining, recreation facilities… everything needed is ready, Even National initiative seawater swimming poor, sea recreational centre and so on, which make you a pleasant vacation. High-speed net connectors are equipped in the houses and service of renting laptops is provided, all these give you a convenient office atmosphere while you are on vacation.

Address: No.17, Haipo tourism and economic zone, Sanya Bay, Sanya city, China

三亚市三亚湾海坡旅游经济开发区17横路

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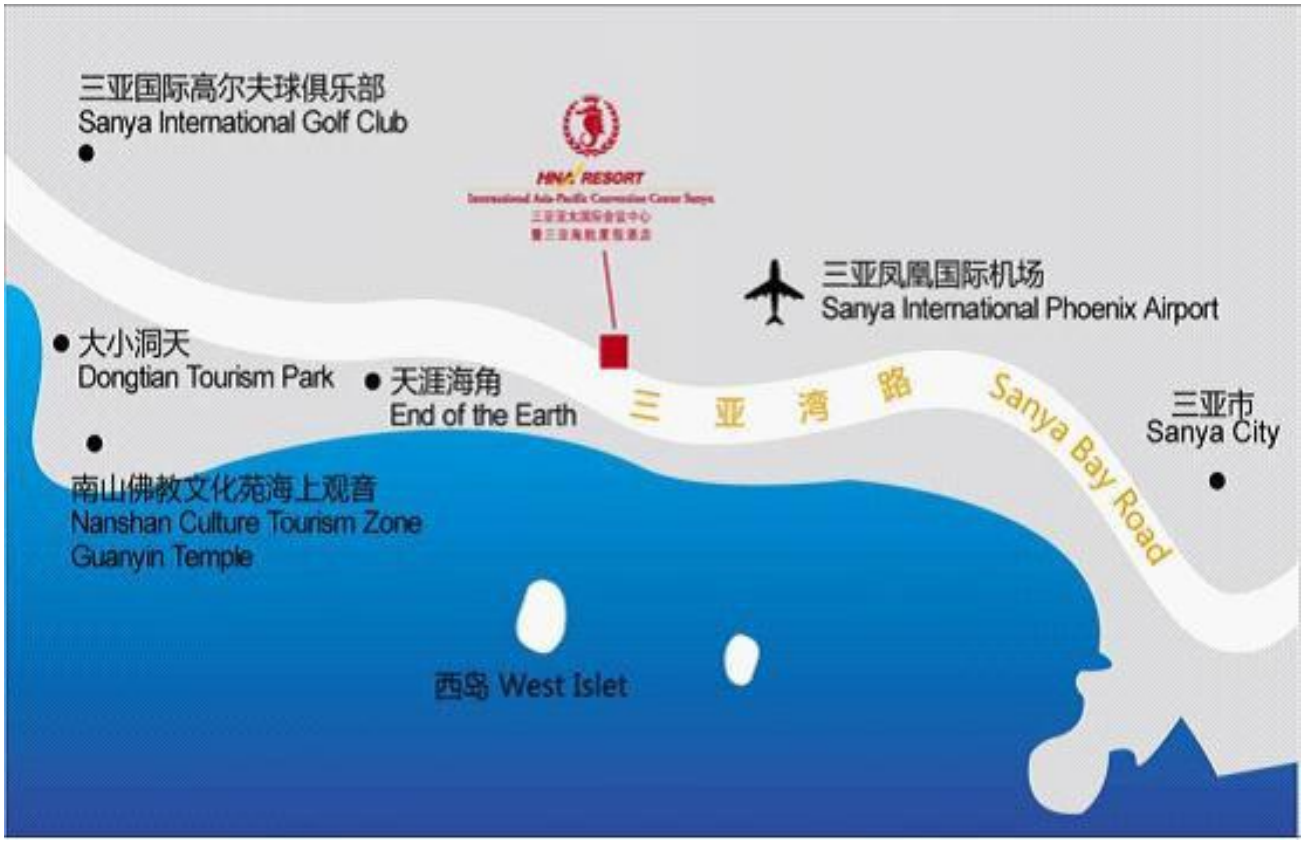
How to Get to the Hotel

Downtown of Sanya: 30 minutes ride
Sanya Phoenix Airport: 15 minutes ride
Sanya International Golf Club: 20 minutes ride
End of the Earth: 10 minutes ride

For non-Chinese author, please show the following info to the driver if you take a taxi:

请送我到：三亚市三亚湾海坡旅游经济开发区17横路
亚太国际会议中心暨三亚海航度假酒店



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