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Part I Conference Schedule

Time: July 16-18, 2021
Location: Kunming Jin Jiang Hotel
昆明锦江大酒店

Date	Time	Location: Lobby, 1st floor		
Jul. 16	**14:00-17:00**	**Registration**		
Date	**Time**	**Location: Room 1(1 号厅), 3rd floor**	**Location: Room 2(2 号厅), 3rd floor**	**Location: Room 3(3 号厅), 3rd floor**
Jul. 17	**08:30-12:00**	**Chemical Science** **Keynote Speech Session 1** **Prof. Lei Chen, Prof. Dan Liu, Prof. Jiuxing Jiang, Prof. Jiaqiang Wang, Dr. Elena Alexandrovna Chugunova** **Chair: TBD** **Group Photo & Coffee Break: 09:50-10:00**	**Computer Science** **Keynote Speech Session 1** **Prof. Kegen Yu, Prof. Shuisen Chen, Dr. Kim Phuc Tran, Dr. Prem Kumar Singh, Prof. Chinthaka Premachandra** **Chair: Prof. Kegen Yu** **Group Photo & Coffee Break: 09:50-10:00**	**Medicine & Healthcare** **Keynote Speech Session 1** **Prof. Kui Luo, Dr. Zhuhuang Zhou, Dr. Sharon Shui Yee Leung, Dr. Mirza Muhammad Faran Ashraf Baig, Dr. Xuming Zhang** **Chair: Prof. Kui Luo** **Group Photo & Coffee Break: 09:50-10:00**
	12:00-13:30	**Lunch** Revolving Restaurant (旋转餐厅) 23rd Floor		
Date	**Time**	**Location: Room 1(1 号厅), 3rd floor**	**Location: Room 2(2 号厅), 3rd floor**	**Location: Room 3(3 号厅), 3rd floor**
Jul. 17	**14:00-18:00**	**Chemical Science** **Keynote Speech Session 2** **Dr. Qiang Chen, Prof. Yajuan Li, Dr. Wenhui Wang, Prof. Ebru YAŞA KAFKAS, Dr. Devalina Ray** **Chair: Dr. Qiang Chen** **Group Photo & Coffee Break: 16:15-16:30**	**Computer Science** **Keynote Speech Session 2** **Dr. Ganeshsree Selvachandran, Dr. Deepak Gupta, Prof. Quazi K. Hassan, Prof. Kathirvel Ayyaswamy, Dr. Khattab M. Ali Alheeti** **Chair: Prof. Kegen Yu** **Group Photo & Coffee Break: 16:00-16:20**	**Medicine & Healthcare** **Keynote Speech Session 2** **Technical Session** **Prof. Longxian Lv, Dr. Kai Wang, Prof. Sai Ho Chan** **Chair: Prof. Kui Luo** **Group Photo & Coffee Break: 16:00-16:10**
	18:00-19:30	**Dinner** Revolving Restaurant (旋转餐厅) 23rd Floor		
Date	**Time**	**Location: Room 1(1 号厅), 3rd floor**	**Location: Room 2(2 号厅), 3rd floor**	
Jul. 18	**08:30-12:00**	**Chemical Science** **Keynote Speech Session 3 & Technical Session** **Prof. Voon Chun Hong** **Chair: TBD** **Group Photo & Coffee Break: 10:10-10:30**	**Computer Science** **Keynote Speech Session 3 & Technical Session** **Prof. Xiran Zhou, Dr. Mufti Mahmud** **Chair: Prof. Xiran Zhou** **Group Photo & Coffee Break: 10:10-10:30**	
	12:00-13:30	**Lunch** Revolving Restaurant (旋转餐厅) 23rd Floor		

Part II Keynote Speech

Chemical Science: Keynote Speech Session 1

Keynote Speech 1: An optical approach to identifying the hyperfine structures of solid-state compounds and their deeply hidden unknown properties and mechanisms

Speaker: Prof. Lei Chen, Hefei University of Technology, China
Time: 08:30-09:10, Saturday Morning, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Crystal structures are fundamental to understand materials properties. In some cases, nevertheless, locally hyperfine structures play a key role in determining the crucial properties of a material. Although there have been a lot of approaches to examining the structures of solid-state compounds, including but not limit to the diffraction of X-ray, electron and neutron for determining the long-range average structure and the nuclear magnetic resonance (NMR), Fourier transform infrared (FT-IR) and extended X-ray absorption fine structure (EXAFS) for examining short-range local structures, that is still a big challenge for us to uncover some unknown properties and mechanisms by identifying their hyperfine structures. By combining with our long-term studies on fluorescent materials, herein we illustrate a facile optical tool with powerful ability on identifying hyperfine structures of solid-state compounds. Any small physical effect on compounds may be reflected by the emission spectra of an activator in the host compound. For examples, charge deformation and orbital hybridization along with crystal distortion caused by doping Gd^{3+} into the rigid garnet structure of $Y_3Al_5O_{12}:Ce^{3+}$ are reflected with the extended band and decreased intensity of Ce^{3+} emission. The exceptional expansion of the local Eu-N bond length, the ratio of which is far larger than the volume expansion of crystal lattice, brought by doping more and more Eu^{2+} ions into $CaAlSIN_3$ host, is presented with the variant distribution of electrons at different energy levels, as can be identified from the excitation spectra of variant Eu-doped $CaAlSIN_3$ phosphors measured at different temperatures. In the structure of Li_2SrSiO_4, a hidden symmetry with space group *C*121 in small domains, caused by symmetry breaking, is identified through employing Eu^{3+} as a spectroscopy probe in Li_2SrSiO_4 structure. Our research approved the existence of symmetry breaking in Li_2SrSiO_4, which exists in a medium possessing its characteristic symmetry in space group $P3_121$ and its subgroup *C*121. These are simple examples of our past work. We look forward to cooperate with the scholars from variant academic fields like you, using this approach to produce meaningful results in future.

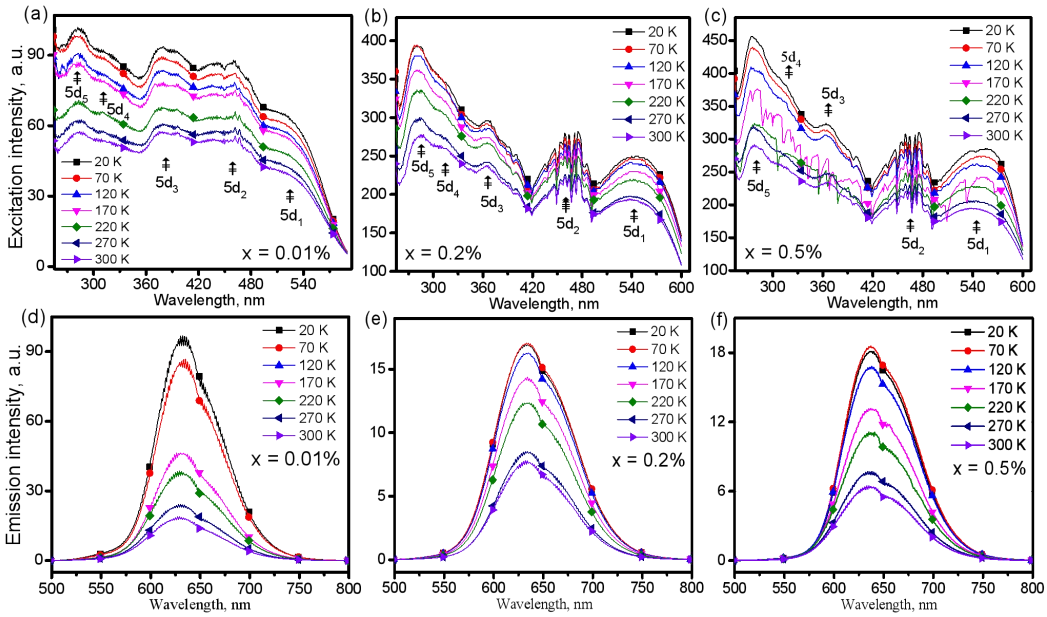


Figure 1. Emission and excitation spectra of $Ca_{1-x}Eu_xAlSiN_3$ (x = 0.0001, 0.002, and 0.005) at low temperatures [2].

References:

[1] Lei Chen, et al. *Scientific Reports*, 2015, 5, 11514.

[2] Lei Chen, et al. *Chemistry of Materials*, 2016, 28, 5505-5515.

[3] Lei Chen, et al. *Advanced Science*, 2019, 6, 1802126

Keynote Speech 2: Towards enhanced yield and direct desulfurization selectivity over hydrodesulfurization catalyst CoMo/ γ -Al_2O_3

Speaker: Prof. Dan Liu, Tiangong University, China
Time: 09:10-09:50, Saturday Morning, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract

The controlled preparation of industrial hydrodesulfurization catalysts CoMo/ γ -Al_2O_3 is of great importance. Here, different complexing agents were used for catalyst preparation, and deep insights into enhanced catalytic selectivity and yields have been gained as well. Dual complexing agents could weaken the strength of the Mo-S bond so that the active phase MoS_2 generates more coordination unsaturated sites and SH groups, which improves the selectivity to the direct desulfurization route, finally increase reaction efficiency and reduce hydrogen consumption.

Keynote Speech 3: Zeolite related inorganic porous materials toward energy and environment applications

Speaker: Prof. Jiuxing Jiang, Sun Yat-sen University, China
Time: 10:00-10:40, Saturday Morning, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract

Zeolite and zeolite related materials are widely applied in the energy and environment applications due to the uniform channel system and well-defined catalytic center. Here, we developed series zeolite related materials that shows superiors performance on the supercapacitor/Zn ion battery and NH_3-SCR (Selective Catalytic Reduction) of NOx.

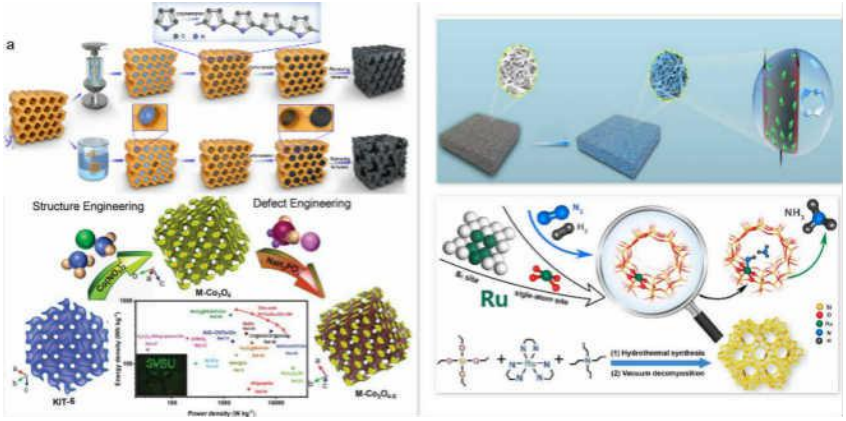


Figure 1: Zeolitic inorganic porous materials towards the energy storage and environent applications.

Refenrence:

1. J. Qiu, J. Jiang* et al., Chem. Mater., 2019, 10.1021/acs.chemmater.9b03099
2. C Teng, X. Lu*, J. Jiang* et al., Chemi. Sci., 2019, 10, 7600-7609.
3. C. Zhang, J. Jiang*, Z. Wang*, W. Yang* et al., Chem. Commun., 2019, 55, 2753–2756.
4. C Teng, X. Lu*, J Jiang* et al., J. Mater. Chem. A. 2018. 6, 18938-18947.
5. C. Zhang, J. Jiang*, X. Zou*. et al., Angew. Chem. Int. Ed. 2018, 57, 6480-6485.

Keynote Speech 4: Biotemplated porous materials for photocatalysis

Speaker: Prof. Jiaqiang Wang, Yunnan University, China
Time: 10:40-11:20, Saturday Morning, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Biotemplating is an effective strategy to obtain morphology controllable materials with structural specialty, complexity, and related unique properties. Due to the presence of nanocavities and channels, the biotemplated materials possess hierarchical pore network and complex functional patterns, as well as biogenic doped chemical elements, which might be particularly suitable for catalysis and separation. In this presentation, we used plant skins, tobacco, natural rubber latex, reed leaves and hydrilla as templates to fabricate mesoporous titania and $ZnIn_2S_4$. These biotemplated catalysts have good photocatalytic activity which could be used for photocatalytic degradation of organic pollutants, photocatalytic H_2 evolution and photocatalytic reduction of Cr^{6+}, oxidation of As^{3+}.

Keynote Speech 5: BENZOFUROXANS AND STRUCTURALLY RELATED N-OXIDE-CONTAINING HETEROCYCLES [video]

Speaker: Dr. Elena Alexandrovna Chugunova, FRC Kazan Scientific Center, Russian Academy of Sciences, Russia
Time: 11:20-12:00, Saturday Morning, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Benzofuroxans possess an unique combination of various chemical characteristics, such as tautomerism, ring opening, and easy transformation upon reactions with electrophilic and nucleophilic reagents. The benzofuroxan system is an excellent platform for the creation of new biologically active compounds. Taking into account the ability of benzofuroxan moiety to release NO, the design of hybrid compounds based on benzofuroxans became currently the most promising area in this field. Benzofuroxans also open a way to the production of various heterocyclic compounds, such as 2H-benzimidazole 1,3-dioxides, benzoxadiazine 4-oxides and 2H-benzimidazole mono-N-oxides. The presence of one or two NO donor moieties in the structure of these heterocycles makes the studies of these compounds being promising for the synthesis of new derivatives and the evaluation of their biological activity towards new objects.

Chemical Science: Keynote Speech Session 2

Keynote Speech 6: Selectivity Control on Hydrogenation reactions through End-On Adsorption of Reactants in Zeolite-Encapsulated Platinum Nanoparticles

Speaker: Dr. Qiang Chen, Sun Yat-sen University, China
Time: 14:00-14:45, Saturday Afternoon, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Platinum nanoparticles encapsulated into zeolite Y (Pt@Y catalyst) exhibit excellent catalytic selectivity in hydrogenation of reactant with more than one reducible group in one molecule to the corresponding desired product. The role of zeolite encapsulation toward perfect selectivity can be attributed to constraint of the substrate adsorbed on the platinum surface in an end-on conformation. This conformation results in the activation of only one adsorbed group, with little influence on the other one in the molecule. Owing to a much lower apparent activation energy of Pt@Y for the hydrogenation of a separately adsorbed required to be reacted group than that of the adsorbed unrequired to be reacted group, thus Pt@Y catalyst showing amazing catalytic selectivities in various hydrogenation reactions, including hydrogenation of substituted nitroarenes, aromatic ketone, 5- hydroxymethylfurfural, and so on.

Keynote Speech 7: Design and photo-chemical sensing properties of novel rare earth mesoporous hybrid materials

Speaker: Prof. Yajuan Li, Hebei University of Science and Technology, China
Time: 14:45-15:30, Saturday Afternoon, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Fluorescence sensing detection has become one of the research frontiers and hot points. Among them, rare earth fluorescent sensors have attracted much attention due to their narrow emission band, high color purity, long fluorescence lifetime and low toxicity. However, due to photostability and thermal stability, the rare earth fluorescent sensors are limited in some degree. Based on this, the rare earth complex with multi-functional ligand were covalently bonded to mesoporous silica matrix, then a series of rare earth mesoporous hybrid materials with excellent luminescent properties and good photothermal stability were synthesized, and the visualization and high sensitivity detection of metal ions, organic

solvents and anions were realized.

Keywords: Rare earth; mesoporous; fluorescent; sensor; inorganic-organic hybrid material

Keynote Speech 8: Developing stable Sn-based materials and Na metal as anodes for high-energy Na batteries

Speaker: Dr. Wenhui Wang, Harbin Institute of Technology, Shenzhen, China
Time: 15:30-16:15, Saturday Afternoon, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
The development of high-energy Na batteries is significantly limited by a stable anode with high capacity and low operating voltage. In this regard, Sn-based materials and Na metal are promising anode candidates due to their high theoretical capacity and low redox potential. However, both of them suffer from poor cycle stability due to their corresponding intrinsic problems. In this talk, our understanding and the proposed remedy approaches to these two systems will be presented and discussed based on our work in recent years[1-8].

Reference:
[1] Hou, Z. et al. Poly(vinylidene difluoride) coating on Cu current collector for high-performance Na metal anode. Energy Storage Materials 24, 588-593, doi:10.1016/j.ensm.2019.06.026 (2020).
[2] Zhang, J. et al. Three-dimensional carbon felt host for stable sodium metal anode. Carbon 155, 50-55, doi:10.1016/j.carbon.2019.08.050 (2019).
[3] Hou, Z. et al. Hybrid Protective Layer for Stable Sodium Metal Anodes at High Utilization. ACS applied materials & interfaces 11, 37693-37700, doi:10.1021/acsami.9b12059 (2019).
[4] Zhang, J., Wang, W. & Li, B. Enabling high sodium storage performance of micron-sized Sn4P3 anode via diglyme-derived solid electrolyte interphase. Chemical Engineering Journal 392, 123810, doi:10.1016/j.cej.2019.123810 (2020).
[5] Wang, W., Shi, L., Lan, D. & Li, Q. Improving cycle stability of SnS anode for sodium-ion batteries by limiting Sn agglomeration. Journal of Power Sources 377, 1-6, doi:10.1016/j.jpowsour.2017.11.084 (2018).
[6] Wang, W., Zhang, J., Yu, D. Y. W. & Li, Q. Improving the cycling stability of Sn4P3 anode for sodium-ion battery. Journal of Power Sources 364, 420-425, doi:10.1016/j.jpowsour.2017.08.060 (2017).
[7] Wang, W., Zhang, J., Li, B. & Shi, L. Electrochemical investigation of Sn-Co alloys as anode for Na-ion batteries. Journal of Alloys and Compounds 780, 565-569 (2019).
[8] Wang, W., Shi, L. & Li, Q. Porous SnSbNPs@3D-C Anode with Improved Stability for Sodium-Ion Battery. Journal of The Electrochemical Society 165, A1455-A1459, doi:10.1149/2.0811807jes (2018).

Keynote Speech 9: Comparison on Fruit Quality Characteristics of Berries

[video]

Speaker: Prof. Ebru YAŞA KAFKAS, University of Çukurova, Turkey
Time: 16:30-17:10, Saturday Afternoon, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Fruits including berries are one of the most important sources of our daily nutritions due to their major aspect from point of view consumers. The fruit quality includes the internal and external properties. The internal quality mainly is determined by aroma, flavor, taste, texture, nutritional quality (soluble sugar content, starch, organic acids, soluble solids content, and carotenoids, total flavonoids, total phenolic, antioxidant activity), flesh firmness, dieases and chemical residues, while the external quality mainly concerns the appearance, size and colour and bruises.
How to measure berry fruit quality has always been one of the most attractive research hotspots in the food industry. For the present, most of the available investigative methods are still destructive, labor and time-consuming, besides, several methods require sample preparation, costly instruments and chemicals, which can not be used for large-scale sample evaluation. With the increasing demands of real-time detection of fruit quality, the non-destructive fruit evaluation methods have been greatly developed. However, problems like low detection accuracy and poor model adaptability still remain in the non-destructive detection system. Thus, it is necessary to develop non-destructive, high-efficient, simple, accurate and low labor coasts techniques for fruit quality determination. In this paper, a comparison of different analytical methods for assessing fruit quality characteristics of berries were discussed.

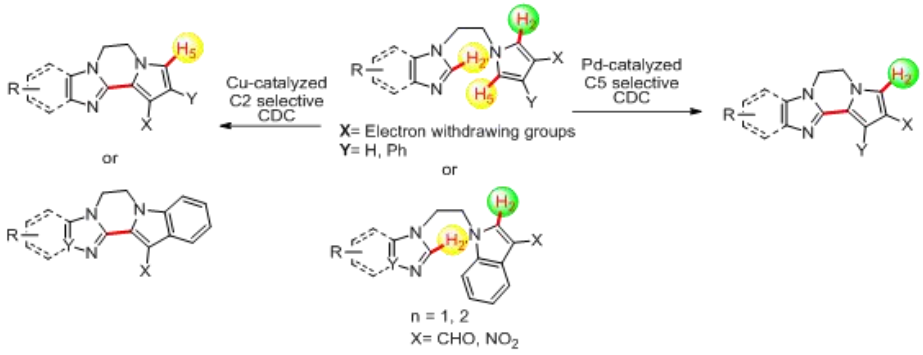
Keynote Speech 10: Transition metal-catalyzed site-selective C-H functionalization of N-heteroaromatics [video]

Speaker: Dr. Devalina Ray, Amity University, Noida, India
Time: 17:10-17:50, Saturday Afternoon, July 17, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Nitrogen containing heterocycles and their analogues are ubiquitous organic scaffolds found in nature and are known as medicinally important pharmacophores, among which azoles, pyrroles, indoles and quinolines have the most frequent occurrence. Hence, the synthetic exploration and expansion of their applications is critical for realizing their full potential. The inherent reactivity of these heteroarenes has enabled direct bond formation even in unfunctionalized scaffolds through transition-metal catalysis. In this

context, the Cu-catalyzed site selective C_2-H activation followed by intramolecular cross dehydrogenative coupling (CDC) of 3-substituted pyrroles and indole derivatives was established for direct access to polycyclic heteroarenes in moderate to good yields. Interestingly, the Pd-catalyzed reaction conditions for 3-substituted pyrrole derivatives preferred C_5-selective intramolecular CDC over C_2-selective products (Scheme 1).

Further, as an advancement towards regioselective C-H functionalization of N-heteroaromatics, transition-metal free intermolecular C_5-H chalcogenation of 8-aminoquinolines was developed under mild reaction conditions. The successful implementation of this methodology was further established through late stage derivatization of pamaquine analogue which is known to be an efficient antimalarial.



Scheme 1: Transition metal-catalyzed C_2 and C_5-selective CDC of N-heteroaromatics

Chemical Science: Keynote Speech Session 3

Keynote Speech 11: Microwave-assisted Synthesis and Characterization of Silicon Carbide Nanomaterials [video]

Speaker: Prof. Voon Chun Hong, Universiti Malaysia Perlis, Malaysia
Time: 08:30-09:10, Sunday Morning, July 18, 2021
Location: Room 1(1 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract

Carbon-based nanomaterials such as carbon nanotubes and graphene have generated enormous scientific and commercial interest because of their extraordinary materials properties. However, the oxidation resistance and thermal stability of carbon-based nanomaterials are limited to 600 ° C. These limitations render carbon nanomaterials' inability to survive in high-temperature, harsh-environment applications. Comparatively, SiC is thermally stable to temperatures exceeding 1000 ° C. For this reason, silicon carbide nanomaterials are being studied and developed for their excellent material properties under such conditions. For the growth of SiC nanomaterials, different routes/techniques have been reported. Long heating duration, large consumption of energy, slow heating rate and requirement for further

purification step to remove impurities were the problems always associated with currently available methods for the synthesis of SiC nanomaterials. Carbon materials are very good absorbents of microwaves and can be easily heated by microwave radiation. In this study, carbon materials such as carbon nanotubes and graphite were reacted respectively under microwave irradiation with silicon dioxide for the preparation of different SiC nanomaterials. Besides, the effect of various processing parameters such as heating temperature, ratio of raw materials, heating duration and types of raw materials on the preparation of SiC nanomaterials were studied and presented.

Computer Science: Keynote Speech Session 1

Keynote Speech 1: Measuring Sea Surface Wind Speed with GNSS-R Technology

Speaker: Prof. Kegen Yu, China University of Mining and Technology (CUMT), Xuzhou, China
Time: 08:30-09:10, Saturday Morning, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Global Navigation Satellite System Reflectometry（GNSS-R）is an emerging remote sensing technology, which obtains the characteristics and parameters of the reflecting surface through capturing, processing and analyzing the reflected GNSS signals. GNSS-R technology has advantages of low cost (no need of dedicated transmitter), large coverage (multiple reflection tracks), and high spatial and temporal resolution. This talk will first give a brief introduction to GNSS-R technology. Then the focus will be on describing how to use data collected by airborne and spaceborne GNSS-R receivers to retrieve sea surface wind speed, including data processing, model construction and performance evaluation. The results from processing extensive airborne and spaceborne data demonstrate that it is feasible to measure sea surface wind speed with GNSS-R and the accuracy can be around 1.6m/s when wind speed is up to 25m/s.

Keynote Speech 2: Remote sensing of total suspended substances and application

Speaker: Prof. Shuisen Chen, Guangzhou Institute of Geography, China
Time: 09:10-09:50, Saturday Morning, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Assessments of total suspended substances (TSS) are important to environmental management and risk analysis of ecosystems. In this study, we discuss the developed process of a two bands TSS remote sensing model for water quality monitoring. The model has been validated by different remote sensing sensors, such as

Landsat TM, MODIS. The model has been applied in estuaries and coasts of United States and China including water bodies with different turbidities. The application is also produced on evaluation of water quality effects on Chinese White Dolphin habitat in Pearl River Estuary and coral reef in southwest of Leizhou peninsula of south China.

Keywords: Total suspended substances (TSS); Remote sensing; Application

Keynote Speech 3: Industrial Artificial Intelligence for Smart Manufacturing: an application in supply chain management [video]

Speaker: Dr. Kim Phuc Tran, the ENSAIT and the GEMTEX laboratory, University of Lille, France
Time: 10:00-10:40, Saturday Morning, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
In recent years, the rapid development and wide application of advanced technologies have profoundly impacted industrial manufacturing, leading to smart manufacturing (SM). The recent development of information and communication technologies has engendered the concept of the smart factory that adds intelligence into the manufacturing process to drive continuous improvement, knowledge transfer, and data-based decision making. SM leverages the automation of processes with less human intervention, the flexibility that allows for early system failure detection, and system automation. Supply chain management affects manufacturing in a variety of ways, including the availability of inputs needed for production processes, and costs. Making appropriate decisions is indeed a key factor to help companies facing challenges from supply chains nowadays. In this paper, we propose two data-driven approaches that allow making better decisions in supply chain management. In particular, we suggest a Long Short Term Memory (LSTM) network-based method for forecasting multivariate time series data and an LSTM Autoencoder network-based method combined with a one-class support vector machine algorithm for detecting anomalies in sales. Unlike other approaches, we recommend combining external and internal company data sources for the purpose of enhancing the performance of forecasting algorithms using multivariate LSTM with the optimal hyperparameters. In addition, we also propose a method to optimize hyperparameters for hybrid algorithms for detecting anomalies in time series data. The proposed approaches will be applied to both benchmarking datasets and real data in fashion retail. The obtained results show that the LSTM Autoencoder based method leads to better performance for anomaly detection compared to the LSTM based method suggested in a previous study. The proposed forecasting method for multivariate time series data also performs better than some other methods based on a dataset provided by NASA.

Keynote Speech 4: Fourth Dimension Data Representation and its Analysis using Turiyam Context [video]

Speaker: Dr. Prem Kumar Singh, Gandhi Institute of Technology and Management-Visakhapatnam, India
Time: 10:40-11:20, Saturday Morning, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
In this era handling uncertainty its significance is considered as one of the crucial tasks for the dark data analysis. In this process problem arises that the data and its uncertainty exists beyond fourth dimensions. To deal with it "Turiyam set" is introduced at Int'l Conference on Operations Research and Applications (ORA 2021) which held at Guilin, China. In this talk the precise representation of fourth dimension data in turiyam context and its application for data analysis will be discussed. This logic is motivated from Yin-Yang theory of Chinese Taoism as well as Sanskrit Yamma-Yammi. One of the most suitable examples is medical diagnoses data set. Let us suppose COVID19 data which contain fourth dimensions uncertainty for the analysis. The people who got recovered can be considered as true regions (t), people who died due to COVID19 can be considered as false regions (f), people who are still active can be considered as indeterminacy (i), people who got vaccinated can be considered as Turiya or Liberated state (l). The refusal degree means people who still did not come under these regions can be represented as 1-(t+i+f+l). This speech will discuss the analysis of fourth dimension data using the Turiyam context.

Keynote Speech 5: Vision based approaches for autonomous flight of aerial robots [video]

Speaker: Prof. Chinthaka Premachandra, Shibaura Institute of Technology, Japan
Time: 11:20-12:00, Saturday Morning, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Vision based techniques have been widely applied in aerial robots to achieve autonomous flight and other operations by them. To apply vision based techniques in autonomous flight control, flight environment recognition by aerial robots itself is very important. This can be achieved by using the on-robot cameras and sensors. The on board cameras can capture the environment to the images in detail rather than other sensors. Thus, the flight environment can easily be recognized by processing the images from on-board cameras. However, to achieve a certain flight control following the image processing results, real time image processing is

extremely important. In addition to that, the image processing should be implemented with light-weight hardware that can be installed in aerial robots. This keynote includes the contents regarding the hardware and software aspects that are required to implement autonomous flight with the on-board cameras.

Computer Science: Keynote Speech Session 2

Keynote Speech 6: The Advent of Artificial Intelligence, Machine Learning and Fuzzy Logic in the Fields of Robotics, Technology, Medicine and Finance [video]

Speaker: Dr. Ganeshsree Selvachandran, Faculty of Business and Management UCSI University, Malaysia
Time: 14:00-14:40, Saturday Afternoon, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Artificial intelligence (AI) is a major branch of computer science that concerns the development of intelligent machines or systems with the ability to think and work in a way that mimics humans. Machine learning (ML) is an application of AI that provides systems with the ability to automatically learn and improve its system through autonomous, unsupervised learning without being explicitly programmed to do so and with minimal human intervention. It focuses on the development of computer systems or programmes that can access data independently, use it to learn autonomously and continually improve its system. The rapid progress of AI and ML has led to the development of many systems and programmes in diverse areas such as medicine, robotics, construction, banking, finance, cyber security and computing technology. Fuzzy logic is a product that originated from the study of fuzzy sets that was introduced by Zadeh in ground-breaking paper on fuzzy sets. Fuzzy logic is a computational paradigm that has the ability to simultaneously handle numerical data and linguistic knowledge by programming computers to imitate human thinking and reasoning with the aim of increasing the efficiency of the decision making process, particularly when handling uncertain or vague data. The theory of fuzzy logic has led to the development of fuzzy inference systems (FISs) which generally refers to the process of feeding the computer a set of fuzzy IF-THEN rules which is then processed using fuzzy reasoning to produce the desired output to solve the given task. Here, the recent advances in the research on AI, ML and fuzzy logic will be discussed, with a special focus on the application of these approaches in the areas of robotics, technology, medicine and finance.

Keynote Speech 7: Role of Universum data for variants of SVMs [video]

Speaker: Dr. Deepak Gupta, National Institute of Technology, Arunachal Pradesh, India
Time: 14:40-15:20, Saturday Afternoon, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
In recent years, several improved variations of SVM have been proposed by researchers. One of them has gained the attention of most of the researchers is Twin Support Vector Machine (TWSVM). TWSVM generates two nonparallel hyperplanes in which each of the hyperplanes is close to one of the two classes and as far as possible from the other class. The difference between SVM and TWSVM is that in SVM we solve only one QPP whereas in TWSVM we solve a pair of QPPs. It is considered that the Universum data lies between the two classes and does not belong to any of the classes. So, in this presentation, we will discuss the novel approach i.e. Universum based Twin support vector machine (UTSVM) which is based on Universum data and their applications.

Keynote Speech 8: Remote Sensing Approach to forest fire danger forecasting

[video]

Speaker: Prof. Quazi K. Hassan, University of Calgary, Canada
Time: 15:20-16:00, Saturday Afternoon, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
At the Earth Observation for the Environment Laboratory in The University of Calgary, we have been conducting research in developing remote sensing-based forecasting system for forest fire danger conditions since 2009. In the scope of this presentation, the chronology of such developments at daily, 4-day, and 8-day time scales will be discussed. We believe that these would be critical for managing forest fire regimes in Canada and elsewhere in the world.

Keynote Speech 9: CYBER FORENSICS: EVIDENCE COLLECTION & FORENSICS TOOLS [video]

Speaker: Prof. Kathirvel Ayyaswamy, SRM Institute of Science and Technology, Vadapalani Campus at Chennai, India
Time: 16:20-17:00, Saturday Afternoon, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Computer forensics is the application of investigation and analysis techniques to gather and preserve evidence from a particular computing device in a way that is suitable for presentation in a court of law. Computer forensics is a branch of digital forensic science pertaining to evidence found in computers and digital storage media. From a technical standpoint, the main goal of computer forensics is to identify, collect, preserve, and analyse data in a way that preserves the integrity of the evidence collected so it can be used effectively in a legal case. General tasks investigators perform when working with digital evidence:

- Identify digital information or artifacts that can be used as evidence
- Collect, preserve, and document evidence
- Analyse, identify, and organize evidence
- Rebuild evidence or repeat a situation to verify that the results can be reproduced reliably

Collecting digital devices and processing a criminal or incident scene must be done systematically.

Keywords: Computer forensics, Collect, preserve, and document evidence.

Keynote Speech 10: Security: An IoT Perspective [video]

Speaker: Dr. Khattab M. Ali Alheeti, University of Anbar, Iraq
Time: 17:00-17:40, Saturday Afternoon, July 17, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Smart applications are employed to enhance human-style life. The Internet of Things (IoT) is recently utilized in designing these environments. Therefore, security and privacy are considered essential parts to deploy and successful smart environments. In addition, most of the protection systems of IoT are vulnerable to various types of attacks. Hence, intrusion detection systems (IDS) have become crucial requirements for any modern system. This security system is heavily based on the internal physical behavior extracted from various IoT devices. The extraction process is considered one of the very tricky issues, but our security system is a great challenge because we have approaches that have to provide a robust system without sending or saving a key.

Computer Science: Keynote Speech Session 3

Keynote Speech 11: Human-level landscape scene recognition with domain knowledge and remote sensing data

Speaker: Prof. Xiran Zhou, China University of Mining and Technology, China
Time: 08:30-09:10, Sunday Morning, July 18, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Frequently-updated remote sensing image provides a potential to support large-scale landscape, and reinforce researchers'competence in understanding, estimating and predicting the influences of natural forces and artificial activities. Recently, the rapid progress of deep learning approaches provides a big possibility of extracting high-level abstract features to characterize the complicated landscape scenes. However, the landscape categories derived from remote sensing images might be insufficient to predict the functionality and organization of different land parcels. For example, the state-of-the-art deep learning approaches can help people recognize different types of objects such as roads, buildings, trees in a variety of residential communities. However, the human-level results like "rich residential community and poor residential community" are challenging for these deep learning approaches. The integration of domain knowledge and the representation of remote sensing data might be an appropriate solution to deal with this challenge. This speech reports the proposed methodological framework to identify human-level landscape scene with features derived from remote sensing data and domain knowledge that landscape scene covers.

Keynote Speech 12: Towards Artificially Intelligent Devices for Healthcare and Rehabilitation [video]

Speaker: Dr. Mufti Mahmud, Nottingham Trent University, UK
Time: 09:10-09:50, Sunday Morning, July 18, 2021
Location: Room 2(2 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
The world is witnessing a rapid increase of the elderly population. This has brought unprecedented challenge in delivering healthcare, specially to the population with neurological disorders. In case of the prevalent ones, such as Alzheimer's and Parkinson's Disease, along with regular medication, technological intervention is a unique way to assist them in their daily lives. While the world is falling short in providing manual

support to these people, thanks to Artificial Intelligence (AI) based innovative solutions, the management of such people with neurological disorder is now possible. The talk will shed lights on how persons with such incurable diseases can be assisted in their daily lives through AI-enabled devices.

Medicine & Healthcare: Keynote Speech Session 1

Keynote Speech 1: Tumor microenvironment-responsive dendritic polymers-drugs conjugates-based nanomedicines for cancer therapy

Speaker: Prof. Kui Luo, Sichuan Universtiy, China
Time: 08:30-09:10, Saturday Morning, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Tumor microenvironment (TME)-responsive drug delivery systems that deliver a drug in spatial-, temporal- and dosage-controlled patterns have become a promising way to realized tumor-specific treatment. We have designed and prepared a series of biodegradable dendritic polymers for multiple stimuli-responsive drug delivery. These nano-agents are shown that exhibit good biocompatibility and significant antitumor efficacy. Furthermore, these nano-platforms conjugated doxorubicin, gemcitabine, paclitaxel and oxaliplatin through pH-sensitive hydrazone bond, N, O-coordination and enzyme-sensitive GFLG linker to prepare a series of TME-responsive nanoscale drug delivery systems. Through the systemic delivery of dendronized PEG-platinum (II), 25-fold higher tumor platinum uptake at 36 h post-injection was seen observed due to the enhanced permeability and retention (EPR) effect, which are much higher than the reported TME-responsive drug delivery systems. Then we designed and prepared a series of TME-responsive branched HPMA nano-platforms via reversible addition-fragmentation chain transfer (RAFT) polymerization, Gd(III) chelating, drug conjugation and cRGDyK functionalization for magnetic resonance imaging and targeted therapy. Finally, we explored systematically the relationship between the structure and their behaviors for drug delivery, and found that amphiphilic dendronized polymers with a moderate HLB value display enhanced stability and highly efficient tumor retention. These high-performance TME-responsive dendritic polymers based nano-platforms may be employed as a safe and efficient multiple stimuli-responsive drug delivery systems for cancer therapy.

Keywords: Tumor microenvironment; Drug delivery systems; Dendritic polymers; Nanomedicines

Keynote Speech 2: Ultrasound backscatter statistics parametric imaging: Theory, methods, and applications [video]

Speaker: Dr. Zhuhuang Zhou, Beijing University of Technology, China
Time: 09:10-09:50, Saturday Morning, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Quantitative ultrasound (QUS) has become an important complement to conventional B-mode ultrasound. QUS techniques have been widely used in characterizing different kinds of biological tissues. Ultrasound backscatter statistics parametric imaging is an emerging technique of QUS which is compatible to conventional pulse-echo ultrasound imaging framework. In recent years, two kinds of ultrasound backscatter statistics parametric imaging techniques have been commercialized: acoustic structure quantification (ASQ) and ultrasound Nakagami imaging. In this speech, we will present the theory, methods, and selected applications of ultrasound backscatter statistics parametric imaging. Specifically, we will discuss model-based techniques (ASQ, ultrasound Nakagami imaging, and ultrasound Homodyned K imaging) and non-model-based techniques such as information entropy imaging. Our recent work on these techniques will be presented. Future developments will be discussed.

Keynote Speech 3: Formulation of inhalable bacteriophage for the treatment of bacterial lung infection [video]

Speaker: Dr. Sharon Shui Yee Leung, The Chinese University of Hong Kong, China
Time: 10:00-10:40, Saturday Morning, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
The misuse and overuse of antibiotics have significantly increased the emergence of multidrug-resistant (MDR) bacteria, posing a high risk for global health. Bacteriophages (phages), natural co-evolving bacteria killers, are viruses that can infect and replicate inside specific bacterial cells, causing no innate harm to humans. The therapeutic use of phage to control bacterial infections was first proposed in the late 1910’s, but it was largely neglected in Western medicine due to the advent of antibiotics in the 1940's. Of late, the commercialization of new antimicrobials is slow. Therefore, phage therapy using obligately lytic phage for therapeutic purposes or as an adjunct to antibiotics is being revitalized in academic research in the West. This is a particularly advantageous strategy as new phage strains active against new bacterial strains can be found relatively quickly. The safety and efficacy of phage in treating patients against drug-resistant bacteria has been demonstrated through multiple clinical trials and

cases of life-saving therapeutic use.
Phage comprises a protein head containing the DNA materials and a tail with the total length ranged 50 – 500 nm. Due to its large size and proteinaceous nature, direct delivery of phage to the respiratory tracts is the preferred route to achieve optimized therapeutic outcomes against lung infections. As preparing liquid phage formulations is relatively simple, nebulization has been the most popular approach to deliver phage for respiratory infections in early research. However, dry powder formulations are preferred over to liquid formulations in terms of storage, transportation and administration. Using two Pseudomonas phages (Podovridae PEV2 and Myoviridae PEV40) as model phages, we have previously demonstrated spray drying as a promising single-step process in producing inhalable phage dry powder formulations with sufficient long storage stability (≤ 1 log titer loss in 12 months) under refrigerated or room temperature at low humidity conditions (< 20% RH). As the phage powders were largely stabilized by an amorphous sugar in the solid state, handling and storing the powders at low humidity condition (RH <20%) is required to minimize the occurrence of recrystallization.
Recently, we have extended the collected knowledge to formulate an inhalable Acinetobacter baumannii phage (vB_AbaM-IME-AB406). We also investigated the effect of high humidity condition upon the administration of phage powders on the stability of phage and in vitro aerosol performance with the aim to identify an optimal formulation suitable for global distribution, including area with subtropical climates where the average RH ≥ 65% all year round.

Keynote Speech 4: DNA Nanotechnology for Modulating the Growth and Development of Neurons [video]

Speaker: Dr. Mirza Muhammad Faran Ashraf Baig, The University of Hong Kong, China
Time: 10:40-11:20, Saturday Morning, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Late prenatal growth, early postnatal growth, and layering of the neocortical neurons (NC-Ns) play determining roles in the development of the cerebral cortex (CC). Here, we systematically explore the interactive role of neuronal surface receptors (NSRs) on cytoskeleton activation (CA) and the piconewton (pN) force generation (P-FG) and their influence on the proper development, growth, and functioning of neurons using a designed DNA nanomechanical device (DNA-NMD).
This DNA-NMD, functioning as a molecular tension probe (MTP), can be used to selectively bind the different NSRs (β -NGFR, Reelin, and Integrin) to mono-, bi-, and trispecifically activate the receptors on the NC-Ns surface for imaging and calculating the P-FG involved in various processes. Measurements in vivo on the brain of newly born Institute of Cancer Research mice (early postnatal) or in vitro after extracting neurons from the fetal brain of pregnant Institute of Cancer Research mice (late prenatal) reveal that there are augmented interactive roles of the β -NGFR with Integrin and Reelin receptors (RR) on the CA and P-FG, resulting in enhanced directional migration of the

neuronal endings (M-NEs), layering, and the somal terminal translocation (S-TT) followed by early postnatal growth.

Keywords: Neocortical neurons (NC-Ns), Neuronal surface receptors (NSRs), Migration of the neuronal endings, Somal terminal translocation, DNA nanomechanical device, Trispecific activation/deactivation

Keynote Speech 5: Non-rigid multi-modal medical image registration [video]

Speaker: Dr. Xuming Zhang, Huazhong University of Science and Technology, China
Time: 11:20-12:00, Saturday Morning, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Image registration is one of key technologies in the field of medical image processing and analysis. Specially, the non-rigid multi-modal 3D medical image registration is highly challenging. To address this problem, we have proposed two kinds of registration methods in recent years. The first strategy is to convert multi-modal image registration problem into the single-modal one using structural representation methods based on Weber local descriptor (WLD), spiking cortical model (SCM) and Zernike moment. The second one is to use deep learning models such as PCANet and Generative Adversarial Networks (GAN) to produce the registered images. The registration performance of our proposed methods will be appreciated and compared with existing structural representation methods and such deep learning methods as VoxelMorph.

Medicine & Healthcare: Keynote Speech Session 2

Keynote Speech 6: Drug development and clinical application based on the regulation of gut microbiota

Speaker: Prof. Longxian Lv, Zhejiang University, Hangzhou, China.
Time: 14:00-14:40, Saturday Afternoon, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
The recent advances in researches and applications of human microbiota have overturned our cognition of health, life processes and diseases. In the last ten years, a large number of studies have found that trillions of microbes live in the

gastrointestinal tract, the oral cavity, skin and the urogenital tract of human body. In particular, nearly 80% of these microbes colonize in the gut and contribute a lot to health and diseases. First, the gut microbiota provide essential physiological functions in the process of human life such as maintenance of host digestion and absorption, regulation of immune systems, participation of material and energy metabolism, and modulation of the functions of livers, lungs, the nervous system and the brain. Second, numerous studies have shown that the gut microbiota play a key role in many diseases such as infections, liver diseases, metabolic diseases, cardiac diseases, autoimmune diseases, tumors, psychiatric disorders. What’ s more, the efficacy of most oral and injectable drugs, and even the success or failure of treatment, is closely related to the composition and function of the human microbiota. At present, the research of gut microbiota has entered the stage of causal analysis and drug development from association research. This article will first briefly introduce the relationship and between the alteration of gut microbiota and the occurrence and development of diseases, and then mainly focus on the development and clinical trials of drugs based on gut microbiota.

Keynote Speech 7: Robust Differentiation of Pluripotent Stem Cells into Competent Endothelial Cells Via Timely Activation of Exogenous ETV2 With Modified mRNA [video]

Speaker: Dr. Kai Wang, Peking University, China
Time: 14:40-15:20, Saturday Afternoon, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Over the last decade, human induced pluripotent stem cell (h-iPSC) – derived endothelial cells (h-iECs) have become a valuable tool in cardiovascular research, offering a broad range of translational and clinical applications. However, current differentiation protocols remain largely inefficient and lack reliability, thus hampering the expansion of this technology. We examined standard protocols to differentiate h-iPSCs into h-iECs and identified that a critical source of inconsistency resides in the nonuniform activation of the transcription factor ETV2 at the intermediate mesodermal stage of differentiation. To overcome this limitation, we developed a method that entails the precise delivery of modified mRNA (modRNA) encoding ETV2 into mesodermal intermediates. Our protocol achieved transient and precise activation of exogenous ETV2 activity throughout the entire mesodermal population. As a result, all h-iPSC lines tested differentiated into h-iECs with exceedingly high efficiency (>90%) and reproducibility. Importantly, we validated that the resulting h-iECs were functionally competent in many respects, including the ability to form perfused vascular networks in vivo. In contrast, we showed that protocols that solely relied on endogenous ETV2 were less efficient and notably inconsistent. Furthermore, we showed that the delivery of exogenous ETV2 directly into h-iPSCs also yielded high differentiation efficiency. However, we demonstrated that bypassing the mesodermal stage produced putative h-iECs with reduced expansion potential and incapable of forming functional vessels in vivo. In summary, we present an approach to differentiate h-iPSCs into

h-iECs with high efficiency and reproducibility, irrespective of the cellular source from which the h-iPSC clones originate. We demonstrated that timely activation of ETV2 at the mesodermal stage is critical to achieving consistency and functional competence. Our results provide a means to generate h-iECs for vascular therapies and research effectively.

Keynote Speech 8: The World Healthcare System --- Seeing the big future [video]

Speaker: Prof. Sai Ho Chan, College of Chinese Medicine, China Medical University, Taiwan, China
Time: 15:20-16:00, Saturday Afternoon, July 17, 2021
Location: Room 3(3 号厅), 3rd floor, Kunming Jin Jiang Hotel

Abstract
Entering 2021, the coronavirus is still spreading across countries and causing panic. It has had a crippling effect on the healthcare systems around the world with cancellation of elective medical services and disruption of daily life. It is shutting down nations, overwhelming hospitals, and moving the world towards a global recession. It is at our doorstep, affecting billions of lives right now. 2020 was a devastating year for global health. We are in the midst of an historic event that will change many aspects of our world. It has now spread to over 215 countries and the recent World Health Organisation (WHO) reports there are over 168,716,435 confirmed cases of COVID-19 with more than 3,505,667 deaths until May 28 this year. The coronavirus exposes our healthcare system's weaknesses. The impact of the coronavirus crisis might be extending further than you think. It could worsen hunger in the developing world. It may increase the number of people bathing acute hunger. The potential long-term consequences the pandemic could here for us are starting to reveal themselves. The pandemic has been shown to increase pre-existing gender-based, geographic, and socioeconomic disparities in access to healthcare.
However, the coronavirus is not the only global crisis we are facing today, nor is it the most important issue that we will be facing in the next few decades. Like the coronavirus, the climate crisis is not a distant threat. The Harvard study adds to recent research showing that taking global action on climate change could improve public health. From public health to clean energy, from organizing to innovating, our world needs people working on the most important issues of our time.
Healthcare systems are complex and there are many things we need to know about types of hospital systems, patient care, insurance, healthcare providers and legal issues. In addition to health systems' function to protect and promote the health of the population, they have many economic and social impacts, which have been largely overlooked to date. Health investment is the smartest investment --- it pays off.
Nevertheless, government responses have been robust and are expected to bolster their respective healthcare systems in the coming months.
Either way, the coronavirus crisis will confront us with certain lessons. It has also been a defining moment for information and communication technologies. Here, I would like to highlight some learning opportunities offered by the current pandemic and their implication for a better future healthcare system. One of the clearest lessons the pandemic has taught us is the consequences of neglecting our healthcare systems.

Part III Technical Sessions

Chemical Science: Keynote Speech Session 3 & Technical Session

Session Chair: TBD

Location: Room 1(1 号厅), 3rd floor 08:30-12:00, July 18, 2021

Time	Paper Title	Author	Affiliation
08:30-09:10	Microwave-assisted Synthesis and Characterization of Silicon Carbide Nanomaterials	Prof. Voon Chun Hong	Universiti Malaysia Perlis, Malaysia
Oral	Solid synthesis of the Ni-SAPO-11 catalyst for hydroisomerization of n-hexane	Yuchao Lyu	China University of Petroleum, East China
Oral	Enhanced visible-light photocatalytic activities of metals doped and Metal Organic Framework coupled-porous Halide Perovskites nanocomposites	ILTAF KHAN	Beijing Institute of Petrochemical Technology, Beijing, China
Oral	Removal of Acid Orange Ⅱ azo dyes using Fe-based metallic glass ribbon catalysts by Fenton-like process	Abdelmajid Lassoued	Shanghai Jiao Tong University, China
10:10-10:30	**Group Photo & Coffee Break**		
Oral	The NIR-induced multifunctional photothermal system for the treatment of cancers	Pingping Huang	Eye Hospital, School of Ophthalmology & Optometry, School of Biomedical Engineering, Wenzhou Medical Univeristy/State Key Laboratory of Ophthalmology, Optometry, and Vision Science
Oral	Precise Synthesis of Acrylate Copolymer via RAFT Polymerization and Its Application	Lei Li	Transfar Zhilian Co.,Ltd/ Zhejiang University of Technology
Oral	Copper-Catalyzed Regioselective Hydrophosphorylation of Terminal Alkynes	Junchen Li	State Key Laboratory of NBC Protection for

			Civilian, Beijing, China
Oral	Cost-Efficient Photovoltaic-Water Electrolysis over Ultrathin Nanosheets of Cobalt/Iron-molybdenum Oxides for Potential Large-scale Hydrogen Production	Xinli Yi	Tianjin University
Oral	Photocarriers-Enhanced Photothermocatalysis of Water-Gas Shift Reaction under H_2-Rich and Low-Temperature Condition over $CeO_2/Cu_{1.5}Mn_{1.5}O_4$ Catalyst	Lizhu Song	Tianjin University
Oral	A synthetic method of O,O-Dialkyl Dialkylpyrophosphonates	Zixuan Zhang	State Key Laboratory of NBC Protection for Civilian, Beijing, China
Oral	Biocatalytic Resolution of a-hydroxyphosphonates	Huijuan Hu	State Key Laboratory of NBC Protection for Civilian, Beijing, China
Oral	In-situ growth of large-area monolithic Fe_2O_3/TiO_2 catalysts on flexible Ti mesh for CO oxidation	Xinyue Tang	a. Institute of Metal Research (IMR), Chinese Academy of Sciences (CAS). b. School of Materials Science and Engineering, University of Science and Technology of China
Poster	Synthesis of fused conjugated polymers by multicomponent one-pot polymerization	Xuediao Cai	Shaanxi Normal University
Poster	Research of Oxidation of alginate by sodium periodate and its degradability and gelation	Xiuqiong Chen	Hainan Normal University
Poster	The influence of conducting polymers with different size or geometric shape on passivation process of metals	Shuangshuang Song	Chemical Engineering Research Center, Tianjin University
Poster	Preparation and photo-thermal self-healing performance of catalyst-free epoxy vitrimer coatings	Chang Cong	Tianjin University

Poster	High-performance single-atom catalysts for efficient electrochemical CO_2 and O_2 reduction	Huinian Zhang	North University of China

Computer Science: Keynote Speech Session 3 & Technical Session

Session Chair: Prof. Xiran Zhou, China University of Mining and Technology, China

Location: Room 2(2 号厅), 3rd floor 08:30-12:00, July 18, 2021

Time	Paper Title	Author	Affiliation
08:30-09:10	Human-level landscape scene recognition with domain knowledge and remote sensing data	Prof. Xiran Zhou	China University of Mining and Technology
09:10-09:50	Towards Artificially Intelligent Devices for Healthcare and Rehabilitation	Dr. Mufti Mahmud	Nottingham Trent University, UK
Oral	A Data Management System for Airbone Remote Sensing Images	Wei Liu	Aerospace Information Research Institute, Chinese Academy of Sciences
10:10-10:30	**Group Photo & Coffee Break**		
Oral	Study for High-Resolution Remote Sensing Imagery Landslide Information Extraction Using Deep Convolutional Neural Network	Wei Xia	Aerospace Information Research Institute, Chinese Academy of Sciences
Oral	Land Cover Classification using Multi-Source Data based on Google Earth Engine	Qin Dai	Aerospace Information Research Institute, Chinese Academy of Sciences
Oral	Application of Land Use Change and Prediction in Urban Planning Evaluation and Formulation	Huipeng Liao	Guangzhou Urban Planning & Design Survey Research Institute; Guangdong Enterprise Key Laboratory for Urban Sensing, Monitoring and Early Warning
Oral	An Evolutionary Many-objective Algorithm Based on a Novel Tournament Selection Strategy	Chao He	Nanchang Hangkong University
Oral	Research on Self-evoked Emotion Recognition Mode	Zebin Li	Nanchang Hangkong University

Oral	Study of epoxy bonding	Xiaohua Zhou	Beijing Institute of Space Mechanics & Electricity
Oral	The Satellite's On-Orbit Attitude System Error Compensation Technique Based on Stereo Models	Yu Zhou	Information Engineering University
Oral	Simulated Scene Generation for Semantic Segmentation Based Dock Extraction from High Spatial Resolution Imagery	Yalan Zheng	Nanjing Normal University
Oral	Spatial Downscaling of Remote Sensing Precipitation Data in the Beijing-Tianjin-Hebei Region	Nuan Wang	Capitol Normal University

Medicine & Healthcare: Keynote Speech Session 2 & Technical Session

Session Chair: Prof. Kui Luo, Sichuan Universtiy, China
Location: Room 3(3 号厅), 3rd floor 14:00-18:00, July 17, 2021

Time	Paper Title	Author	Affiliation
14:00-14:40	Drug development and clinical application based on the regulation of gut microbiota	Prof. Longxian Lv	Zhejiang University, Hangzhou, China
14:40-15:20	Robust Differentiation of Pluripotent Stem Cells into Competent Endothelial Cells Via Timely Activation of Exogenous ETV2 With Modified mRNA	Dr. Kai Wang	Peking University
15:20-16:00	The World Healthcare System --- Seeing the big future	Prof. Sai Ho Chan	College of Chinese Medicine, China Medical University, Chinese Taipei
16:00-16:10	**Group Photo & Coffee Break**		
Oral	Novel 2-Phenyl-3-(Pyridin-2-yl) Thiazolidin-4-one Derivatives as Potent Inhibitors for Proliferation of Osteosarcoma Cells in vitro and in vivo	Shunying Liu	East China Normal University
Oral	Two Birds One Stone: 14-3-3ζ blocker inhibits both GPIb signaling and αIIbβ3 outside-in signaling in platelets	Chuanbin Shen	University of Toronto, Toronto, Canada
Oral	Chinese Australians' Attitudes towards the Stigma of Mental Illness: Analysis using Structure Equation Modelling with AMOS	Tan Kan Ku	Institute of Health and Management, IHM, Melbourne, Victoria, Australia
Oral	Salvianolic acid B attenuates CCl_4-induced liver fibrosis in mice by regulating LncRNA-ROR and NF-κB/IκBα signaling pathways	Rong Wang	Shanghai 9th People's Hospital, Shanghai Jiao Tong University School of Medicine
Poster	Chemical Constituents from the Medicinal Rhizomes of the Amomum genus and their Biological Activities	Hong Yin	College of Chemistry & Pharmacy, Northwest A&F University

Poster	Whole genome sequence of actinobacteria isolated from mangroves reveals the secondary metabolite production potential	Dini Hu	Beijing Forestry University
Poster	Studies on the Novel Cyclopeptide Alkaloids of *Justicia procumbens* L.	Hong Jin	Center for Disease Control and Prevention of PLA, Beijing, China
Poster	Bioinformatics Based Virtual Screening of Novel Antimicrobial Peptides from Byasa mencius	Xianda Hu	Beijing Tibetan Hospital, China Tibetology Research Center

Part IV Technical Session Abstracts

Chemical Science

ID: ICC2021_20000

Title: Solid synthesis of the Ni-SAPO-11 catalyst for hydroisomerization of n-hexane

Name: Yuchao Lyu

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Abstract

Improving the metal dispersion improves the catalytic activity of metal based catalysts, while the synthesis of non-noble metal catalysts with high metal dispersion is still challengeable. The Ni-SAPO-11 catalyst with highly-dispersed metal species was synthesized via a solid synthesis method and applied in n-hexane hydroisomerization. The novel method involved the addition of nickel source into the solid synthesis system of SAPO-11. The strong metal-support interaction and geometric effect of SAPO-11 framework inhibited the aggregation of nickel, enabling the even distribution of nickel oxides with a narrow diameter of 2-4 nm. Brønsted acid sites were increased due to the incorporation of nickel into the framework of SAPO-11. The high metal dispersion, rich acid sites and great metal-acid synergism contributed high activity and isomers selectivity to the Ni-SAPO-11 catalyst. The maximum yield to i-hexane was 65.9% at a 92.1% isomers selectivity which were comparable to that of the Pt/SAPO-11 catalyst. Therefore, catalyst prepared in this work can be taken as a potential alternative to the noble metal catalyst for hydroisomerization of n-hexane and the solid synthesis method is expected to be expanded to other supported catalysts.

Keywords: hydroisomerization, metal dispersion, nickel, SAPO-11

ID: ICC2021_20001

Title: In-situ growth of large-area monolithic Fe_2O_3/TiO_2 catalysts on flexible Ti mesh for CO oxidation

Name: Xinyue Tang

Affiliation: a. Institute of Metal Research (IMR), Chinese Academy of Sciences (CAS).

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Abstract

In this study, we reported the in-situ fabrication of a series of Fe_2O_3/TiO_2 monolithic catalysts on flexible Ti mesh via plasma electrolytic oxidation process, hydrothermal reaction and chemical bath deposition (CBD) method. The morphology tailoring of Fe_2O_3 nanostructures finds that Fe_2O_3 nanosheets supported on TiO_2 exhibit superior catalytic performance with a complete oxidation of CO at 260 °C. The catalytic stability test indicates that the in-situ grown Fe_2O_3/TiO_2 catalysts own outstanding performance for continuous CO oxidation due to the strong substrate adhesion without mass loss. The microstructures and interfaces of Fe_2O_3/TiO_2 catalysts are well studied using series of characterization techniques. The in-situ preparation strategy of metal oxide catalysts in this work will open up more opportunities for the rational design of variety of monolithic catalysts used for CO oxidation, de-NOx, three-way catalysis and other related application in industry.

Keywords: Fe_2O_3/TiO_2 nanostructures; Monolithic catalysts; Plasma electrolytic oxidation; In-situ fabrication; CO oxidation

ID: ICC2021_20003

Title: Enhanced visible-light photocatalytic activities of metals doped and Metal Organic

Framework coupled-porous Halide Perovskites nanocomposites

Name: ILTAF KHAN
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Abstract

In recent years, consumption of fossil fuel resources and environmental pollution have been considered the two serious threats in the modern world. In this modern era, the excessive emission of CO2 is causing greenhouse effect and responsible for global warming. Apart from this, the effluents with hazardous organic pollutant badly effecting human and aquatic life. On the account of this, Heterogeneous semiconductor photocatalysis is one of the most active, cost effective, non-toxic, high-efficient, and promising approach to solve both energy and environmental issues. Among various photocatalysts, halide perovskite (MHPs) based photocatalysts have received great attention attribute to its suitable band gap, high stability, tunable lattice structure, visible light active features. However, these MHPs have some draw backs originate from its small surface area, low light absorption, low charge separation and high charge recombination rate. In order to make MHPs as a model and highly efficient photocatalysts, we have synthesized some novel porous MHPs by simultaneously doping with metals and coupling with MOFs. Based on XPS, inductively coupled plasma emission spectroscopy (ICP-AES), TEM, DRS, fluorescence spectra related to • OH amount, photoelectrochemical I-V curves, TPD and BET results, it has been confirmed that the introducing of pores has enlarge the surface area, doping of metals extended the light absorption trough creating surface status and optimizing band gap. While the coupling of TS worked dual function of enlarging the surface area and enhancing the charge separation by upgrading high level energy electrons. Finally, our current research approach opens a new gateway to synthesize large surface area and visible-light active efficient metal halide perovskite-based nanocomposites photocatalysts for CO2 conversion and environmental remediation.

Keywords: Metal halide perovskite; Metals doping; MOFs coupling; Nanocomposites; CO2 conversion, Pollutants degradation

ID: ICC2021_20006

Title: Removal of Acid Orange Ⅱ azo dyes using Fe-based metallic glass ribbon catalysts by Fenton-like process

Name: Abdelmajid Lassoued
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Abstract

The unique structural characteristics of metallic glasses make them highly qualified to be applied in the treatment of azo dyes and other organic pollutants based on their superior catalytic performance. In the present work, the degradation of azo dyes in aqueous solutions by using $Fe_{78-x}Co_xSi_9B_{13}$ (with x = 0, 6 and 12) metallic glass (MG) ribbon catalysts was performed, taking Acid Orange Ⅱ (AO Ⅱ) as colorant model pollutant. The UV – vis spectral changes of AO Ⅱ with the operating parameters in aqueous solution during Fenton-like process were studied. It was illustrated that the addition of Co to $Fe_{78}Si_9B_{13}$ MG ribbon deteriorated the catalytic ability. The Fenton-like process is an effective process for the degradation of azo dyes AO Ⅱ in the presence of $Fe_{78}Si_9B_{13}$ MG ribbon catalysts at low H_2O_2 and Fe^{2+} concentrations and in an acidic medium. Under the optimal reacting conditions, 96.5 % degradation efficiency of azo dyes in aqueous solution was achieved after 12 min of reaction.

Keywords: Degradation; Acid Orange II azo dyes; Fenton-like process; UV–vis spectra; Hydroxyl radica; Kinetics studies

ID: ICC2021_20005

Title: High-performance single-atom catalysts for efficient electrochemical CO_2 and O_2 reduction

Name: Huinian Zhang

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Abstract

Single-atom catalysts (SACs) have been reported as highly efficient electrocatalysts for CO_2 reduction (CO_2RR) and O_2 reduction (ORR) owing to their maximised metal utilisation efficiency, high catalytic activity and unique electronic and geometric structures. It is important to synthesize nonprecious metal-based SACs (Fe, Co) to enhance the CO_2RR and ORR performance. Here we will show how we use metal macrocycles to synthesize SACs with unusually high performance, as shown in Fig. 1. Firstly, a catalyst consisting of single-atom CoN_4 active sites embedded in graphene matrix (CoN_4/G) is synthesised by high-energy ball milling of graphene nanosheets and cobalt tetrasulfonated phthalocyanine. This catalyst exhibits superior performance in CO_2RR with a high CO Faradaic efficiency of nearly 95% at -0.76 V (vs. RHE) and remarkable durability. Secondly, a single-iron-atom electrocatalyst embedded in N-doped carbon with $Fe-N_5$ moieties is synthesised through prolonged calcination of melamine and hemin co-adsorbed on oxide graphene. The catalyst exhibits an enhanced ORR activity in alkaline mediums with an admirable half-wave potential of 0.84 V, outperforming FeN_4-C, which has four-coordinated Fe $-N_4$ moieties.

Keywords: CO_2 electroreduction; O_2 electroreduction; Cobalt; Iron; Single-atom catalysts

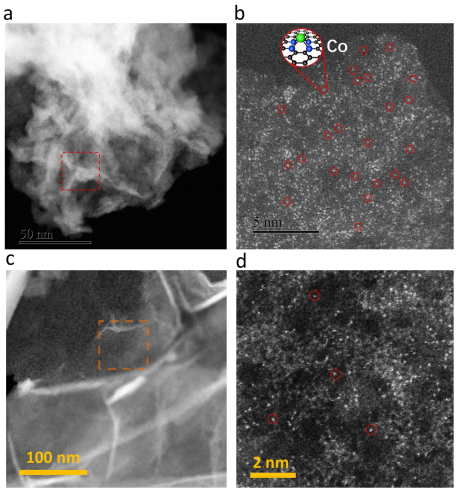

Fig. 1. STEM images of (a, b) CoN_4/G, (c, d) atomic $Fe-N_5$ sites embedded in N-doped carbon

ID: ICC2021_20008
Title: Cost-Efficient Photovoltaic-Water Electrolysis over Ultrathin Nanosheets of Cobalt/Iron-molybdenum Oxides for Potential Large-scale Hydrogen Production
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Abstract

Unassisted photovoltaic (PV)-water splitting to hydrogen system is of great potential for future environmentally-friendly fuel production from renewable solar energy. However, industrialization simultaneously requires higher efficiency, sustained stability and lower cost of the system. In this work, the ultrathin cobalt/iron-molybdenum oxides nanosheet on nickel foam (NF) were prepared for efficient HER and OER, respectively, delivering a relatively low voltage of 1.45 V at 10 mA cm^{-2} in two-electrodes configuration. Water electrolysis at low voltage driven by electrocatalysts is critical for realizing energy conversion. Integrated with commercial monocrystalline silicon cell, the H_2 area specific activity of 0.47 L m−2 h−1 was achieved with a solar-to-hydrogen efficiency of 15.1% under solar simulator illumination (100 mW cm^{-2}) and no performance degradation appeared over 160 h. Such a solar conversion technology demonstrates the potential for long-term and cost-efficient H_2 production in large-scale industrialization and provides an exploration for new-type of energy-conversion system.

Keywords: overall water splitting, photovoltaic-water splitting, solar-to-hydrogen conversion, electrocatalysis, stability

ID: ICC2021_20009
Title: Photocarriers-Enhanced Photothermocatalysis of Water-Gas Shift Reaction under H_2-Rich and Low-Temperature Condition over $CeO_2/Cu_{1.5}Mn_{1.5}O_4$ Catalyst
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Abstract
Aiming for cost-efficient hydrogen purification for application of fuel cells, a low-temperature water-gas shift (WGS) reaction over noble-metal-free catalyst to attain completed CO conversion in H_2-rich atmosphere is required but still a great challenge. Herein, we present a configuration of semiconductor-bridging active sites in $CeO_2/Cu_{1.5}Mn_{1.5}O_4$ catalyst to work for the photothermal WGS reaction under light irradiation; due to the injection of photocarriers from CeO_2 into active sites, a 61% reduction of apparent activation energy enabled the WGS reaction to occur at 225°C. Notably, the catalyst delivered a 96.6% of CO conversion in 30 min, and subsequently, 0.18 vol.% of CO was left in the system, which matches the industrial standard (< 1 vol.%). This study provides a new design idea on the semiconductor-coupled photothermal catalyst to boost catalytic performance.
Keywords: Photothermocatalysis, $Cu_{1.5}Mn_{1.5}O_4$, CeO_2, photocarrier, water-gas shift reaction

ID: ICPC2021_20000
Title: Precise Synthesis of Acrylate Copolymer via RAFT Polymerization and Its Application
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Abstract
A series of different sequence structure containing stearyl acrylate (SA) and hydroxy-ethyl acrylate (HEA) copolymer were synthesized via reversible addi-tion-fragmentation chain transfer (RAFT) polymerization. The crystallization property of PHEA-b-PSA, PHEA-b-PSA-b-PHEA, PSA-b-PHEA-b-PSA, PHEA-co-PSA, and PHEA-grad-b-PSA were characterized by Differential Scanning Calorimetry (DSC). The condensed structure of different sequence copolymers were investigated using small-angle X-ray scattering (SAXS). A series of copolymers with different sequence structure were coated on the surface of polyester fabric, which can be found that PHEA-b-PSA-b-PHEA block copolymer has good Water repellency.
Keywords: RAFT polymerization, different sequence structure, crystallization property, Water repellency

ID: ICPC2021_20002
Title: The influence of conducting polymers with different size or geometric shape on passivation process of metals
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Abstract
Conducting polymers have gotten many studies and been applied in various fields because of their unique properties on optics, electrics, photoelectric and the advantages of modifying polymer structure according to specific condition. In recent years, many researchers found that conducting polymers can promote the formation of passivation layer to improve corrosion resistance properties. In this article, the influence of conducting polymer nanoparticles with different size and geometric shape on passivation process of ferrous metals was discussed. The smaller nanoparticles are, the quicker ferrous metals passivate. When the radius of sphere nanoparticles are changed from 1 μm to 100 nm, the passivation rate is about 30 times faster. The geometric shape of nanoparticles will affect the contact area thus have an influence on passivation. Flake nanoparticles are best for accelerating passivation process.
Keywords: conducting polymers, passivation, different size and geometric shape

ID: ICPC2021_20007
Title: Preparation and photo-thermal self-healing

performance of catalyst-free epoxy vitrimer coatings

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Abstract

Because of their excellent self-healable ability at high temperature, epoxy vitrimers based on dynamic transesterification are intensively studied. While, the application of epoxy vitrimers is mainly limited by selection of organic catalysts which are poorly soluble in polymer matrix. Normally, the substrates and epoxy vitrimers need to be pre-heated to over 100℃ to improve the fluidity of uncured epoxy vitrimers and to guarantee the integrity of epoxy vitrimer coatings on substrates. So, hot-press method and overall heating are necessary for curing and self-healing of scratched epoxy vitrimer coatings. The above processes seriously limit the application of epoxy vitrimers. Herein, tertiary amino group served as the catalyst for transesterification reaction was introduced into the epoxy/carboxylic acid cross-linked network by pre-curing process of epoxy resin and amine curing agent. And, solvent method was applied to displace the pre-heating process and dispersed carbon black used as photo-thermal agents. The carbon black/epoxy vitrimer composite coating was coated on the glass at room temperature. After being cured at 130℃ for 3h, a coating without surface defects was obtained. The scratched composite coating can be healed at 92.7% after being illuminated under the concentrated solar light for 3min without external pressure, and the healing efficiency was similar with that of heated at 160℃ for 2h in an oven. The study provided a new strategy for synthesis and repair of epoxy vitrimers for potential application in coatings.

Keywords: catalyst-free, dynamic transesterification, vitrimers, photo-thermal self-healing, coating

ID: ICPC2021_20009

Title: Research of Oxidation of alginate by sodium periodate and its degradability and gelation

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Abstract

Low molecular weight alginate is favored by researchers due to its unique physical and chemical properties and biological activity. This topic used sodium periodate as the oxidant to oxidize the two -OH groups at the C-2 and C-3 positions of the uronic acid unit of sodium alginate (SA) and used different amounts of sodium periodate to prepare oxidized sodium alginate (OSA) with various oxidation degrees. The degree of oxidation of OSA was measured by ultraviolet spectrophotometry, and the relationship between the amount of sodium periodate and the oxidation degree of SA was explored; the structure of OSA was characterized through Fourier transform infrared spectroscopy (FT-IR), 1H nuclear magnetic resonance (1H NMR), X-ray Diffraction (XRD) and thermogravimetric analyzer (TGA). At the same time, gel permeation chromatography (GPC) and rheometer (DHR) were used to determine the gel-forming ability and degradation performance of the material. The results showed that the two adjacent -OH groups of SA uronic acid units were successfully oxidized to form the aldehyde groups, and as the amount of sodium periodate increased, the oxidation degree of SA continued to increase, the molecular weight continued to decrease, and the gelation ability continued to weaken, and degradation performance continues to rise. It is shown that OSA with different properties can be prepared by regulating the molar ratio of sodium periodate and alginate glyoxylate, which greatly broadens its application.

Keywords: Sodium Alginate; Degree of Oxidation; Sodium Periodate; Gelling; Degradability

ID: ICPC2021_20010

Title: Synthesis of fused conjugated polymers by multicomponent one-pot polymerization

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Abstract

A facile and efficient multicomponent polymerization approach to construct fused heterocyclic conjugated polymers with imidazo[2,1-b]thiazole units in the main chain was established. A preliminary polymerization reaction was carried out as a model reaction with 1, 4-phthalaldehyde, [6,6'-bibenzothiazole]-2, 2'-diamine and 1-ethynyl-4-hexylbenzene as monomers, the different polymerization conditions, including catalysts, catalyst amount and solvents, were optimized. Based on the optimized conditions, a series of fused heterocyclic conjugated polymers containing imidazo[2,1-b]thiazole units with high-molecular weight in moderate yields were obtained. With imidazo[2,1-b]thiazoles embedded in the main chains, the resulting polymers possess outstanding good solubility, high thermal stability and low energy band. A possible mechanism was proposed for the polymerization including a 5-exo-dig cyclization and then aromatization process.

Keywords: fused conjugated polymers, imidazo[2,1-b]thiazole units, multicomponent, one-pot polymerization

ID: ICPC2021_20011

Title: The NIR-induced multifunctional photothermal system for the treatment of cancers

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Abstract

Uveal melanoma is an adult ocular caner with a poor diagnostic outcome. The special microenvironment of the uveal melanoma provides a possible way to targeted treat it. This work aims to design a novel NIR-responsible multifunctional nanocomposite system as a free-radical generator and a photothermal agent as well. Azobisisobutylimidazoline hydrochloride (AIBI) was further incorporated as an initiator. When the system was irradiated by a NIR laser, the mesoporous copper sulfide (M-CuS) nanoparticles will transfer the light energy to the heat energy which is able to kill the most cancerous cells. Simultaneously, AIBI will also be catalyzed by the NIR laser to generate alkyl radicals which can damage the DNA of residual cancerous cells. The formation of free-radicals is not oxygen-dependent. This suggests that the as-designed system is able to kill cancers at the hypoxic tumorous environment. In addition, the concentrated glutathione (GSH) at the tumorous environment will weaken the inhibition effect of reactive oxygen species on the tumorous cells. Presence of M-CuS will consume GSH to catalyze the reduction of H_2O_2 to •OH. This is beneficial to highly targeted treat cancers based on the unique tumorous microenvironment.

Keywords: Uveal melanoma, mesoporous copper sulfide, alkyl radicals, photothermal treatment, tumorous microenvironment

ID: COC2021_20001

Title: Copper-Catalyzed Regioselective Hydrophosphorylation of Terminal Alkynes

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Abstract

Introduction: Organophosphorus compounds have attracted significant attention due to their application in the development of organocatalysis, fire retardants, and biologically active compounds. The preparation of alkynyl-/alkenyl-phosphonates and related derivatives, showing prominent late-stage modification potential, could be accessed from alkynes and H-phosphates. Both Markovnikov and anti-Markovnikov (E-type and Z-type) adducts were often observed in the reaction, thus, the controllable regioselectivity is still current

research focus. Zhao exploited a copper-catalyzed monophosphorylation of alkynes with the aid of O_2 or N_2 for the synthesis of alkynylphosphonates and alkenylphosphonates, respectively[1,2], however, the regioselectivity to furnish the E- or Z-alkenylphosphonates were not well resolved.

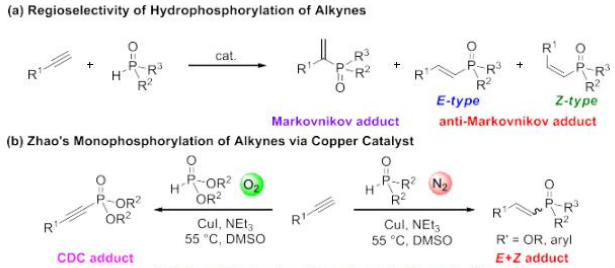

Figure 1. Tunable hydrophosphorylation of alkynes

Results & Discussion: Employing CuCl as the catalyst and organic base, we developed a simple and robust method for the regioselective hydrophosphorylation of terminal alkynes. A widely available alkynes and H-phosphates and analogues are converted into the corresponding alkenylphosphonates with good to excellent yileds.

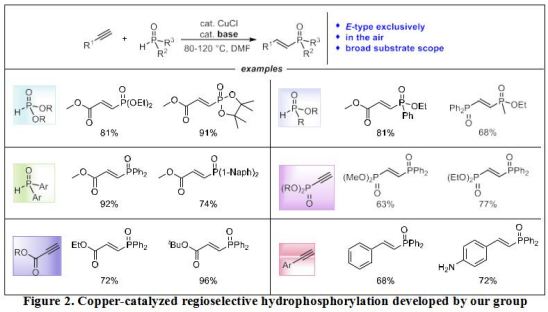

Figure 2. Copper-catalyzed regioselective hydrophosphorylation developed by our group

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ID: COC2021_20002

Title: Quinine Catalyzed Asymmetric Synthesis of β -chloro- α -Hydroxyphosphonates by Pudovik Reaction

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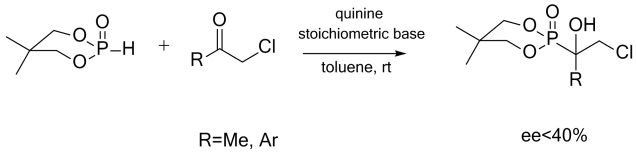
Abstract

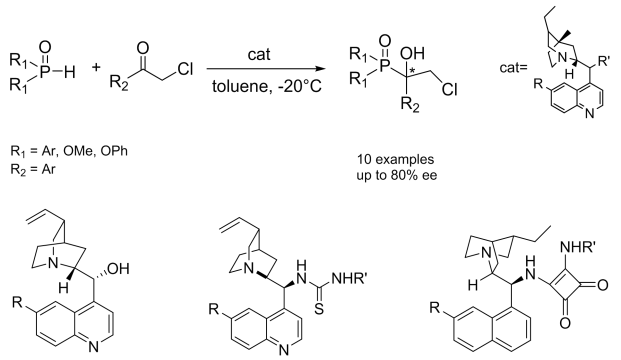
α-Hydroxyphosphonates and its derivatives have been widely as antivirus agents, anticancer agents, HIV proteases and enzyme inhibitors because of their abundant structural types and outstanding biological effects. The most utilized synthetic method for the synthesis of α -hydroxyphosphonate is the nucleophilic addition of phosphites to carbonyl compounds via Pudovik reaction. The readily available quinine analogs have shown potent catalytic abilities in asymmetric Pudovik reactions but only with moderate selectivities. Herein, we wish to report a high enantioselective synthesis of chiral β-chloro-α -hydroxyphosphonates catalyzed by quinine-based catalysts under mild conditions. P(III) reagents containing single and double P-C bonds both achieved the related products with good to high ee values.

Keywords: Pudovik reaction, α -Hydroxyphosphonates, Quinine catalyzed, Asymmetric synthesis

a) Previous work



b) This work



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ID: COC2021_20003

Title: Regiospecific Synthesis of Z-conjugated Enol Phosphates by 1,3-Hydrogen Rearrangement

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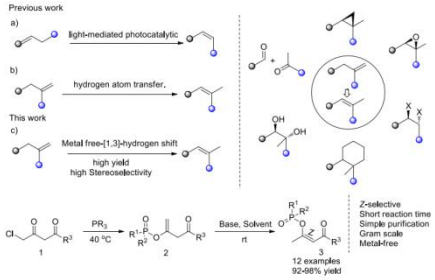
Abstract

Stereoselective synthesis of olefins is quite attractive in organic synthesis due to the large scope of applications of olefin functional groups in anticancer drugs. As a key structural motifs, enol phosphates especially the higher bioactive Z-isomers have been widely used in investigated among natural products and pharmaceuticals. However, the Z/E selective preparation of enol phosphate products remains a challenge now. Herein, we disclose the first regiospecific synthesis of Z-conjugated enol phosphates from Perkow reaction followed by a 1,3-hydrogen rearrangement of the unconjugated intermediates.



The above metal-free procedure can be accomplished within only 4 hours at room temperature giving the target Z-products with high yields.

References:

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ID: COC2021_20004

Title: TCGV Promoted Direct Isothiocyanation of P(O)H

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Abstract

Introduction: Pseudohalophosphates are a kind of organophosphorus compounds that exhibit important applications in pharmaceutical and biological fields and so on. Phosphoroisothiocyanates possesing P-N=C=S pseudohalogenic functional group have been widely used as organic synthetic intermediates and active pharmaceutical ingredients. Among the numerous developed methods, the most straightforward synthetic approach is the phosphorylation of phosphorochloridats. Herein, we wish to report a new “ one-pot ” direct isothiocyanation method which employed an in situ cholorination of P(O)H by TCGV and then transformation into P(O)NCS by MSCN. P(O)H reagents containing P-C bonds were also found applicable to achieve the target phosphonoisothiocyanates and phosphinoisothiocyanates products in high yields.

Keywords: Phosphoroisothiocyanates; Chlorination activator; One-pot reaction

Results:

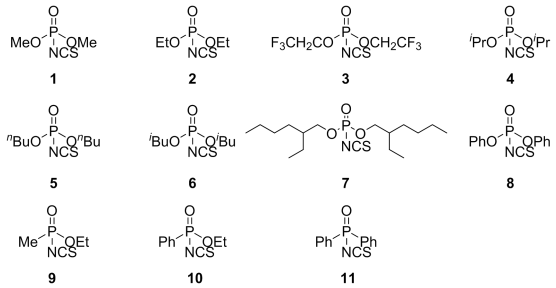

Figure 1. Synthesis of organophosphorus isothiocyanates

References:

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ID: COC2021_20005

Title: A synthetic method of O,O-Dialkyl Dialkylpyrophosphonates

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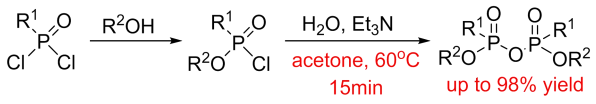
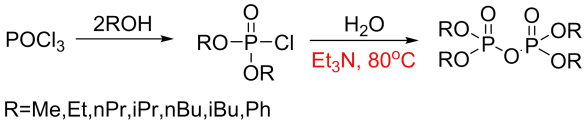
Abstract

O,O-Dialkyl dialkylpyrophosphonates (DADAPPs) are a kind of important organic phosphorus componds which are by-products of production and storage of organophosphorus nerve agents and can be considered as important forensic markers for the verification of organophosphorus nerve agents and are covered in the list of CWC text. At this stage for DADAPPs synthesis method and properties of research is not comprehensive, literatures report for compounds with purine substituents, aromatic substituent and annular fat substituents, for short chain DADAPPs, international concentrated in a few OPCW designated laboratory area of research.Traditional synthesis methods have many short comings,such as long reaction time, the existence of by-products, so to find an efficient synthesis method of DADAPPs is of great signifiance.

On the basis of the methods reporter in previous literature, we screened solvents, temperature and base, and determined that the best results were obtained when the model reaction was performed with Et_3N and water in a mole ratio of 1:1.2:0.5 at the condition of acetone reflux, the product yield is up to 98%.These compounds have shown two signals in the ^{31}P-NMR spectra as a result of two stereogenic centres.We also screen resulted in a solvent free method for synthesizing tetraalkyl pyrophosphates with fast speed.The difference is the ^{31}P-NMR spectra of tetraalkyl pyrophosphates is single, and these compounds are more chemically active than DADAPPs.





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ID: COC2021_20006

Title: Biocatalytic Resolution of a-hydroxyphosphonates

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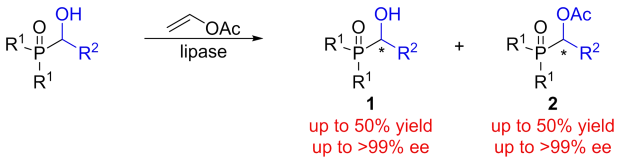
Abstract

Enzyme catalysis (biocatalysis) has found increasing number of applications in organic chemistry including the synthesis of optically active compounds. Comparison with the chemical synthesis of chiral hydroxyphosphonates, which usually involves asymmetric organocatalysts, harsh reaction conditions and low selectivity, biocatalytic resolution of rac-hydroxyphosphonates are highly efficient, highly enantioselective and environmentally benign. We have shown that CALB, a lipase B from Candida antarctica, is able to efficiently and enantioselectively transform a variety of rac-hydroxyphosphonates into highly enantiopure hydroxyphosphonates and corresponding acetates. Herein, we report the highly selectively biotransformations of a series of rac-hydroxyphosphonates into corresponding acetates under mild reaction conditions.



R^1 = OMe, OEt, Ph, OBn, 2-MePh, 3-MePh, 4-MePh, 2-MeOBn, 3-MeOBn, 4-MeOBn, 4-FOBn, 4-ClOBn, 4-BrOBn, 4-NO_2OBn
R^2= Me, Et, i-Pro

Catalyzed by CALB (commercially available) in vinyl acetate under mild reaction conditions (37 ℃), a number of rac-hydroxyphosphonates were converted by the lipase into optically pure corresponding acetates product in moderate to excellent yields with ee up to 99%. We also expect their synthetic applications by the concerted cycloaddition reactions of the resulting chiral acetates and hydroxyphosphonates derivatives.

Reference:

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Computer Science

ID: AIR2020_10008
Title: Calibration Method of Magnetometer based on BP Neural Network
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Abstract

Due to the influence of processing technology and environmental factors, there are errors in attitude measurement with the three-axis magnetometer, and the change of parameters during the operation of the magnetometer in orbit will have a great impact on the measurement accuracy. This paper studies the calibration method of magnetometer based on BP neural network, which reduces the influence of model error on calibration accuracy. Firstly, the error model of the magnetome-ter and the structural characteristics of the BP neural network are analyzed. Sec-ondly, the number of hidden layers and hidden nodes is optimized. To avoid the problem of slow convergence and low accuracy of basic BP algorithm, this paper uses the Levenberg Marquardt backpropagation training method to improve the training speed and prediction accuracy and realizes the on-orbit calibration of magnetometer through online training of the neural network. Finally, the effec-tiveness of the method is verified by numerical simulation. The results show that the neural network designed in this paper can effectively reduce the measurement error of magnetometer, while the online training can effectively reduce the error caused by the change of magnetometer parameters, and reduce the measurement error of magnetometer to less than 10nT.

Keywords: Magnetometer calibration, neural network, Levenberg-Marquardt method, On-orbit training

ID: ICRSTA2021_20000
Title: The Satellite's On-Orbit Attitude System Error Compensation Technique Based on Stereo Models
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Abstract

According to the problem that the low measurement accuracy of TH-1 satellite star sensor, the low frequency and "slow drift" error which cannot be ignored in the attitude determination system, resulting in obvious random error in the horizontal position and elevation direction, and the change of the error with

time and latitude, cannot be cali-brated by the ground field of the real problem. In this paper, a low frequency detection model is established by using the principle of relative orientation, and the low fre-quency error is obtained by parallax elimination. Finally, the satellite attitude is com-pensated and a more accurate exterior orientation elements are obtained, thus im-proving the positioning accuracy and stability. The experimental results show that: the proposed methods are feasible, and by using the model to dynamically calibrate the exterior orientation angle elements on orbit, the plane and elevation errors of the ground points can be basically eliminated. The global uncontrollable positioning accu-racy and stability of the photogrammetry satellite are improved.

Keywords: Attitude measuring system; Low frequency error; Dynamic calibration; Relative ori-entation

ID: ICRSTA2021_20003

Title: Simulated Scene Generation for Semantic Segmentation Based Dock Extraction from High Spatial Resolution Imagery

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Abstract

Deep learning-based semantic segmentation methods, such as fully convolutional networks (FCNs), are state-of-the-art techniques for object extraction from high spatial resolution images. However, massive scene-formed training samples containing both targets and backgrounds are generally required to prevent model over-fitting problem, which is time-consuming and labour-intensive thus limiting FCN-based semantic segmentation. Data augmentation, also called data expansion, can automatically generate extra data on the basis of existing ones and partially overcome the problem of lacking training samples. A simulated scene generation method is proposed in this study for hydraulic facility extraction using FCN-based semantic segmentation. Docks are a typical and representative kind of hydraulic facility. Manual sample collection of docks is tedious because of their very diverse types and configurations. To this end, dock extraction is selected as the application case for the design of simulated sample generation schemes. This design also has reference values for other hydraulic structure extractions. A suite of automatic sample augmentation based on simulated scene generation methods with dock extraction taken as an example is proposed to reduce manual workload. Firstly, a small number of docks are manually collected from the HSR imagery. Standard data augmentation operations are applied to expand the sample set. Then, the sample set is augmented in the following three modes. I) Style transfer mode. The pix2pixHQ network in this mode expands the sample set by transferring texture features between dock targets. II) Target embedding mode. Image inpainting technique is first used to obtain backgrounds without dock targets. Dock main directions and embedding points are determined using the region-line primitive association framework. Docks are then embedded into repaired backgrounds considering spatial relationships amongst docks, water body and shorelines to generate simulated scenes and expand the sample set. III) Mixed mode. Style transfer and target embedding modes are combined, that is, simulated docks are generated via texture transfer and then embedded to backgrounds using mode II whilst expanding the sample set. Lastly, these generated dock samples form the sample set for training and classification of the UNet model to extract docks. In order to verify the proposed method, dock extraction experiments are conducted on China's GaoFen-2(GF-2) imagery with expanded sample sets. The GF-2 satellite with 1m panchromatic and 4m multispectral cameras was successfully launched in Taiyuan on August 19, 2014. Two GF2 images were collected at different locations along the Yangtze River to cover various types of docks. Multispectral and panchromatic images were pansharpened using Gram-Schmidt method. The resolution of fused images was 1 m, with sizes of 29,008 × 27,171 and 28,688 × 27,337 pixels, respectively. Four sub-regions, including different

dock types, were selected as sample areas for simulated scene generation and model training. These sub-regions contain approximately 17% of the total docks. Five sample augmentation schemes were designed and listed in Table 1, and UNet was trained to extract docks to test the method performance by obtaining and comparing the method accuracy with each sample augmentation scheme. Four accuracy evaluation measures are utilized in dock extraction, they are Precision, Recall, F1 and IoU. Precision and Recall measures are generally in conflict with each other in practice. Thus, F1 and IoU are used to evaluate the experimental results comprehensively. Experimental results showed that the proposed schemes can successfully generate sufficient simulation samples by offering a small number of real samples, increase sample diversity and subsequently improve semantic segmentation accuracy. Compared with results that use the original real sample set, measures of F1 and IoU of dock extraction accuracy demonstrate a maximum improvement of 20.53% and 23.01%, respectively, after sample augmentation.

Keywords: sample augmentation, image inpainting, style transfer, semantic segmentation, dock extraction, high-resolution remote sensing, deep learning

ID: ICRSTA2021_20004

Title: Spatial Downscaling of Remote Sensing Precipitation Data in the Beijing-Tianjin-Hebei Region

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Abstract

Precipitation is an important part of the global hydrological cycle. The large-scale, high-precision continuous precipitation data obtained by satellite remote sensing detection technology has become an important source of spatial precipitation data. However, because the spatial resolution of remote sensing precipitation data is still low, it is difficult to meet the needs of hydrological research, which restricts their application in drought and flood analysis, hydrological simulation, etc. In response to this problem, this paper takes the Beijing-Tianjin-Hebei region as the research area, downscaling the TRMM data and the GPM data space of the continuation plan, and increasing the spatial resolution of the data to 1km. Compared with the original data, spatial downscaling data not only greatly improves the spatial resolution, but also increases the accuracy of the data, which has better applicability.

Keywords: TRMM, GPM, Spatial downscaling, Geographically Weighted Regression

ID: ICRSTA2021_20006

Title: A Data Management System for Airbone Remote Sensing Images

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Abstract

Thie presentation will describe our recent works about building a general data management system for airbone remote sesnign images captured by different types of airbone camera systems including passive and active sensors. In order to provide a fluent and smooth data processing and management pipeline for data processing operators and end users, the system should be deeply integrated with the operation management system and a number of data processing systems in a seamless way. Not only is it responsible for archiving and managing the images at different levels of processing, but also it should administer numerous auxiliary data, such as flight planning data, position and orientation data, universal time coordinated data, ground control points, and data quality reports. Obviously, it is a big chanllege meeting these requirements. We will introudce the design and capabilties of the system, and talk about our practice experience gained from building such complicated system in more detail.

Keywords: Airbone Remote Sensing, Data

Management, Data Service

ID: ICRSTA2021_20007

Title: Study for High-Resolution Remote Sensing Imagery Landslide Information Extraction Using Deep Convolutional Neural Network

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Abstract

The landslide geological disaster brings huge loss to the people's life and property, there will be a long active period after its occurrence. Therefore, the ability to quick extract information on landslides qualitatively and quantitatively, carry out landslide assessment and prediction, is essential in disaster prevention, monitoring, and other applications. Due to complexity of geographical conditions of landslide disaster, especially in the high-altitude plateau areas, relying on human surveys is inefficient and costs a long period. However, utilizing remote sensing technology for landslide information extraction has great advantages. In recent years, along with the rapid development of remote sensing technology, the remote sensing imagery resolution of satellites are increased constantly, and the traditional analysis method for remote sensing image based on medium and low-resolution ratios has been not applicable to current research and applicable demands. The emergence of deep learning makes it possible to use high-resolution remote sensing images to accurately extract landslide hazard information. This paper summarizes the current research difficulties of landslide information extraction, and comprehensively studies the characteristics of high-resolution remote sensing image data and landslide image features for deep learning. Based on the idea of feature-driven classification, the design and optimization methods of deep convolutional network structure are proposed, with key considerations of the terrain factor, slope, aspect and Normalized Difference Vegetation Index (NDVI) are used as multi-source data input to optimize the training method of model. By combining atrous convolution, pyramid pooling and Encoder-Decoder structure, this paper conducts effective combination of multi-scale features and contextual information. This paper proposes a landslide information extraction model of fully convolutional spectral-topography fusion network (FSTF-Net) based on fusion of multi-source data, which can not only identify different shapes of landslide and ground object targets, but also be able to recover clearly boundary of landslide, obviously enhance recognition precision of landslide and other categories. We evaluate the proposed method on the southeastern Qinghai-Tibet Plateau datasets and the experimental results demonstrate that our method performs better than deep learning methods. Compared with the state-of-the-art DeepLab_v3+ our model gains 2% and 5% improvements in overall classification accuracy and the landslide detection percentage. The FSTF-Net model can make full use of existing multi-source data to form an end-to-end complete and accurate framework for the landslide extraction.

Keywords: high-resolution remote sensing image; classification; landslide information extraction; deep learning; encoder-decoder

ID: ICRSTA2021_20008

Title: Land Cover Classification using Multi-Source Data based on Google Earth Engine

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Abstract

Land cover data is the key data source for various studies, for example, ecosystem service assessment, natural resource monitoring, food security and global change. Remote sensing data has been widely used for production of land cover data. With the rapid development of remote sensing technology and the

successful launch of various exploration satellites, massive remote sensing data resources can be used for land surface information extraction. How to efficiently use these multi-source data to quickly map land cove has become a huge challenge. Google Earth Engine (GEE) is a cloud platform with powerful capabilities in accessing and processing massive multi-temporal and multi-source data, it provides an effective implementation for land cover product generation. Since the launch of the "Belt and Road" initiative in 2013, domestic and foreign scholars have successively carried out research on different issues in different regions along the "Belt and Road". The land cover dynamic change of China-Pakistan Economic Corridor (CPEC)is a very important research topic. In order to dress the issue of land cover classification combined with massive multi-source spatial data sets based on the GEE platform, this research generates land cover map of Pakistan, utilizing the five spatial data sets of surface reflectance, vegetation index, water index, night light data, and digital elevation data as the basic datasets of land cover. This research indicates that using GEE can highly efficient utilization of multi-source data and could help to greatly reduce the time of land cover mapping compared with the traditional mode of non-cloud platform.

Keywords: GEE platform; multi-source spatial data; land cover classification

ID: ICRSTA2021_20009

Title: Study of epoxy bonding

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Abstract

Bonding is used widely when the optical glasses are connected with metal structures. It plays a very important role in the design of space telescope. Improper bonding may induce great surface figure error for optics in telescope. Milbond and EC2216 are the most popular epoxies that are used in optics. Bubbles usually exist in the epoxy when two components are mixed or translated to syringe. In this paper, the methods and experiments of adhesive mixture and injection in vacuum environment were explained to reduce the bonding surface figure of the mirror. The results show that adhesive mixture and injection in vacuum environment can dramatically decrease the bubble in the epoxy and greatly reduce the bonding surface figure error.

Keywords: epoxy, Bonding, Vacuum, Milbond, EC2216

ID: ICRSTA2021_20010

Title: Application of Land Use Change and Prediction in Urban Planning Evaluation and Formulation

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Abstract

The study monitored land use change in Nansha during 2000-2018, evaluate Nansha's urban planning by the overlay analysis of land use general planning, land use distribution, and economic data, and predicted the urban expansion in 2025 and 2035 to provide scientific information for urban planning in the future. The results showed that the built-up area rapidly expanded (78.32 km^2 to 153.75 km^2 in 2000 – 2018), and the GDP and the newly-added enterprises remarkably increased as well. Most of built-up area matched the land use planning. The urban expansion was simulated to 168.27 km^2 in 2025 and to 207.04 km2 in 2035 for future land use planning.

Keywords: Land Use/Land Cover Change; Urban Expansion Simulation; Urban Planning

ID: MLPRIS2021_20000

Title: An Evolutionary Many-objective Algorithm Based on a Novel Tournament Selection Strategy

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Abstract

Recent studies in scientific research and engineering practice have the tendency to employ evolutionary algorithms to solve multi-objective optimization problems (MOPs), which has a certain effect. In the evolutionary process, the mating selection that aims to make a good preparation for exchanging the information of individuals plays an important role in multi-objective evolutionary algorithms (MOEAs). However, exsiting MOEAs usually use random selection strategy to form the mating pools. This strategy of generating offspring has a certain randomness, which will affect the quality of offspring, thereby deteriorating the effectiveness of the algorithm. To address this issue, we propose a novel tournament selection strategy, in which a type of binary tournament selection strategy based on the grid dominance relation and density information is adopted to select individuals for variation. The experimental results indicate that the proposed method performed well in terms of convergence and diversity, especially due to the significant benefits of high-dimensional objective space handling.

Keywords: Convergence, Diversity, Evolutionary Multi-objective Optimization (EMO), Grid, Many-objective Optimization, Tournament Selection

ID: MLPRIS2021_20001

Title: Research on Self-evoked Emotion Recognition Mode

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Abstract

Emotional psychological phenomenon is one of the main functions of the human brain. Accurate recognition of emotions occupies an important position in the research of human-computer interaction, and its results can be applied in medicine, education, psychology and other directions. At present, researchers have done a lot of research work on emotion recognition based on EEG. Most of the traditional EEG-based emo-tion recognition databases are based on emotions induced by external stimuli, and most of the emotion recognition studies are based on these databases. However, in actual life and work, emotions that are self-evoked by individuals often occur, and there is little research on this part of emotions. In the present study, we studied the EEG signals recorded from 20 subjects while listening to 30 different pieces of music, all of which represented five different emotions, including excitement, joy, neutrality, sad-ness, and panic. After listening to each different segment, we asked each subject to generate self-induced emotions by recalling the music segment they had just played. Further research into the functioning of the human brain has revealed that emotions are not passively generated due to external stimuli, but are actively created in our minds. We use 30*60 samples generated by external stimuli as the training set, estab-lish a classification model, and use the established model to predict the category of self-induced emotions. Through analysis and comparison of experimental results, we find that the emotions induced by external stimuli are compared with self-induced emotions. The emotions produced have many commonalities. For example, the elec-trodes on the right temporal lobe play a great role in distinguishing negative emotions. For fearful emotions, the prefrontal lobe electrodes are effective. These studies will provide great help for the real-time recognition of EEG emotions, and can achieve more friendly human-computer interaction.

Keywords: EEG signals, Self-evoked, Feature extraction, Machine learning, Classification

Medicine & Healthcare

ID: CMI2020_10002

Title: Paper Clinical Value of Color Doppler Ultrasonography in Diagnosis of Lower Extremity Arterial Disease of Diabetes Patients

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Abstract

Objective: To evaluate the diagnostic value of color Doppler ultrasound in the diagnosis of diabetic lower extremity vascular diseases. Methods: 48 patients with diabetic lower extremity vascular disease admitted in our hospital from september 2018 to september 2019 were included in the study and divided into the observation group, and another 48 patients with the same period of health examination in our hospital were included in the study and divided into the control group. Both groups used color Doppler ultrasound to detect the blood flow of lower extremity vessels. The incidence of blood flow, vascular diameter and stenosis, occlusion and arteriosclerosis of the lower extremity were observed. Results: The blood flow and vascular diameter of the lower extremity in the observation group were significantly lower than those in the control group ($p < 0.05$). The incidence of vascular stenosis, vascular occlusion, thrombus, intimal thickening and plaque in the observation group was 85.42%, 22.92%, 10.42% and 93.75% respectively, which was significantly higher than that in the control group was 10.42%, 0.00%, 0.00% and 14.58% ($p < 0.05$). The incidence of lower extremity vascular lesions in the observation group was significantly higher than that in the control group ($p < 0.05$). Conclusion: Color Doppler ultrasound is of high diagnostic value in the diagnosis of diabetic lower extremity vascular diseases, and can be used to determine the blood flow of the lower extremity and the inner diameter of popliteal artery, thigh artery, dorsalis pedis artery and so on. At the same time, it can also clearly show the specific situation of vascular occlusion, arteriosclerosis and thrombosis, which is of great significance for the prevention and diagnosis of lower extremity vascular lesions, and can provide the basis for the treatment of lower extremity vascular lesions.

Keywords: Super color Doppler ultrasound; diabetic complications; lower extremity vascular disease; diagnostic value

ID: ICNH2020_10005

Title: Walking rehabilitation evaluation based on gait analysis

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Abstract

With the development of medicine and the improvement of people's living stand-ards, the issue of rehabilitation is getting more and more attention. Gait rehabili-tation provides a brand-new treatment method for patients with walking disfunc-tion. It is currently recognized as an advanced rehabilitation medical method in the world. In recent years, the number of patients suffering from dyskinesias in the lower limbs in China has been increasing, and the society's demand for walk-ing rehabilitation treatment is also increasing. The emergence of gait rehabilita-tion solves the problem of fewer therapists and more patients, reduces the inten-sity of the therapist's work, and has the incomparable advantage that traditional rehabilitation methods lack. However, because there are no mature related prod-ucts in China at present, and the prices of foreign products are very expensive, domestic medical institutions have not yet put them into practice. Accelerating the development of gait rehabilitation equipment is of great significance for improv-ing China's medical level, improving the quality of life of patients, and reducing social burden. Usually, high-precision optical sensors are installed on human limbs or using high-speed cameras to capture motion.

However, due to the high cost of the equipment, the relative high price of image processing software when processing the collected motion data. In this paper, the acceleration sensors are installed on the human body and the data in a gait cycle can be obtained. After smoothing, using it as the input signal for gait feature extraction and classification. In order to classify normal gait and abnormal gait for evaluation and better walk-ing rehabilitation.

Keywords: rehabilitation, gait, accelerator sensor, SVM

ID: ICNH2020_10006

Title: Factors Relating to Nurses' End-of-Life Care

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Abstract

This integrative review aimed to investigate factors relating to end-of-life care of nurses. The review was conducted according to PICo (Participant, area of Interest, and Context). Keywords identified were: "nurse" AND "end- of- life care" ('dying care' OR 'death care', OR 'near end-stage of life care' OR 'palliative care' OR 'hospice care' OR 'comfortable care in near-death' OR 'quality of dying patients care'), AND "nurses". The database searched through PubMed, ProQuest, Google Scholar, Web of Science and SCOPUS. The searching inclusion criteria were limited to English and Chinese language studies about nurses' end-of-life care from 2010 to 2019, yielding 258 English language articles and 2 Chinese language articles. Results: A total of fifteen articles were selected based on inclusion criteria. Two subjects were obtained from the results that related to nurses' care during the process of end of life: 1) Nurses' demographic factors; and 2) Modifiable factors. Nurses' demographic factors were age, years of work experience, level of education and experience of the death of a family member/friend. Modifiable factors included knowledge, attitude, confidence, relationship, environment and resources, communication, nursing activities, philosophy and culture of care, skills and training. These factors were explored in various countries and the majority of the studies had been conducted in public government hospitals. Conclusion: The major power ability of care was observed in nurses who acted the significant part in caring for the terminally ill during the dying process. Caring for dying patients was related to many factors that could affect the fabric of nursing care at the end stage of life. The elements found in this review could lead to recommendations with implications for nursing practice so as to improve and enhance end-of-life care. Some factors could be considered as predictors affecting nursing practice for chronically ill patients in further research. In addition, nurses' tranquility care in community hospitals should be more focused.

Keywords: end of life, care, dying, relating factors, nurses

ID: ICNH2021_20100

Title: Chinese Australians' Attitudes towards the Stigma of Mental Illness: Analysis using Structure Equation Modelling with AMOS

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Abstract

Aim: The quantitative study aims to elucidate the relationship between contact factor with someone who has a mental illness, cultural values, and differential approaches towards mental illness (depression versus schizophrenia) among 138 Chinese immigrants in Australia. The study results aim to provide community mental health literacy program to immigrants in Australia that seek to lessen their attitudes of stigma towards mental illness.

Method: A cross-sectional survey (General Population Questionnaire) comprising of 118 items) was

administered to 138 Chinese immigrants (96 female and 42 male) to examine their Cultural Affiliation (Chinese versus Australian Identification). Factor analyses were conducted to examine the discriminant validity of the subscales.

Findings: Chinese Australians endorsed more Chinese Culture Identification than Australian Culture Identification. These immigrants endorsed more highly collectivist values than individualistic values. Stigma factors (social distancing and negative stereotyping attitudes) correlated negatively with readiness to give support to the depression vignette than the schizophrenia vignette. Pearson's correlation matrix and Hierarchical Regression Analyses when cultural values and vignette approaches were considered as influencing factors – details of the subsequent findings will be reported in another paper.

Conclusion: Several Structured Equation Models suggested that attitudinal approaches towards someone with a mental illness and stigma is associated with Contact level and Cultural Affiliation. Contact is better placed as a mediating factor.

Keywords: Mental Illness, Culture, Stigma, Structure Equation Modelling

ID: MCDD2021_20001

Title: Salvianolic acid B attenuates CCl_4-induced liver fibrosis in mice by regulating LncRNA-ROR and NF-κB/IκBα signaling pathways

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Abstract

Background: Liver fibrosis occurs as a result of numerous chronic liver diseases with multiple pathophysiological issues. Unfortunately, there is no effective therapy against it. Salvianolic acid B (Sal B) is the main active component from Salvia miltiorrhiza, which is regarded as a potential candidate drug for the treatment of liver fibrosis. However, the concrete mechanism by which Sal B imparts its beneficial, anti-fibrotic effect remains unclear.

Purpose: This study aimed to establish the influence of Sal B in a mouse model of CCl4-stimulated liver fibrosis and to elucidate its anti-fibrotic properties.

Methods: The effects of Sal B on hepatic fibrosis were examined in mice by evaluating factors associated with the disease including body weight, liver function, serum liver fibrosis index, and histological changes. The protein or gene expression levels of LncRNA-ROR and NF-κB/IκBα signaling pathways were assessed using western blot and real-time PCR. Cellular proliferation was monitored by Cell Counting Kit-8.

Results: Sal B exhibited anti-fibrotic effects against CCl4-induced liver fibrosis by inhibiting hepatic function, hepatic fibrosis index, activation of hepatic stellate cells (HSCs), deposition of collagen, and ameliorating the degree of liver fibrosis. Sal B inhibited NF-κB/IκBα signaling pathways and HSCs proliferation. In addition, Sal B downregulated the expression of LncRNA-ROR. Silencing LncRNA-ROR inhibited HSCs proliferation while gain of the LncRNA-ROR function promoted the proliferation.

Conclusion: The results demonstrated that Sal B attenuates hepatic fibrosis via the regulation of LncRNA-ROR and NF-κB/IκBα signaling pathways.

Keywords: Liver fibrosis; Salvianolic acid B; LncRNA-ROR; NF-κB/IκBα

ID: MCDD2021_20002

Title: Chemical Constituents from the Medicinal Rhizomes of the Amomum genus and their Biological Activities

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Abstract

Diabetes mellitus and inflammation belong to common diseases affecting human's health, with high morbidity. Medicinal plants play an important role in the

prevention and treatment of metabolic and inflammatory disorders. Fruits and rhizomes of Amomum genus can be used as medicine and contain abundant amounts of diterpenoids, essential oils, flavonoids, and phenols. In an endeavor to discover structurally interesting and bioactive components beneficial for human life and health from medicinal rhizomes of A. villosum var. xanthioides, a new tetranorditerpenoid (1), two new labdane diterpenoids (2, 3), together with fourteen known analogues (4−17) were isolated. Compound 1 is an unprecedented rearranged tetranorlabdane diterpenoid, featuring a 6/6/5 fused tricarbocyclic skeleton with an α, β-unsaturated cyclopentenone unit. Their structures and absolute configurations were established by spectroscopic data, including 1D and 2D NMR, and the experimental and calculated ECD data. All the isolates were evaluated for their hypoglycemic and anti-inflammatory activities, and compound 4 showed inhibitory activities with IC50 values of 10.0 and 2.4 μM, respectively. The kinetic analysis indicated that 4 bound mainly in a single class of inhibition sites on α-glucosidase with a mixed-type manner, and the Ki value was calculated as 9.5 ± 0.1 μM. Molecular docking showed that 4, the most potent NO inhibitor, bound tightly to the active cavity of iNOS with binding energy of –9.13 kcal/mol.

Keywords: Medicinal plants, Chemical Constituents, Amomum genus, Hypoglycemic activity, Anti-inflammatory activity

ID: MCDD2021_20003

Title: Novel 2-Phenyl-3-(Pyridin-2-yl) Thiazolidin-4-one Derivatives as Potent Inhibitors for Proliferation of Osteosarcoma Cells in vitro and in vivo

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Abstract

Osteosarcoma (OS) is the most common malignant tumor of adolescent skeletal system with a 5-year survival rate of less than 30%. Due to unknown pathogenesis and unidentified drug target, no drug for the target treatment of OS has been launched to the market. It is essential to discover new molecular entities by phenotypic screening for the effective treatment of OS. Herein, thiazolidone molecule 1a was discovered as hit compound (IC50 = 321.9 nM for MNNG/HOS cells) by pheno-typic screening with a lab-constructed structurally diverse library. The study of structure-activity relationship (SAR) was focusing on the improvement of metabolic stability of the resulting thiazol-idone compounds in vitro and in vivo. And the final water-soluble lead compound (R)-8i was ob-tained as a potential inhibitor for proliferation of OS cells by the modulation of the relative rigidity and solubility of the compounds (ClogP and water solubility) with remarkable cellular potency (IC50 = 21.8 nM for MNNG/HOS cells) and in vivo efficacy, as well as pharmacokinetic properties (Figure 1). Compound (R)-8i also significantly suppresses OS cell migration in vitro. (R)-8i was also showed to be well-tolerated. The preliminary investigation for the target identification of (R)-8i has also been explored to exclude p53 and myoferlin (MYOF), which has been developed as a po-tential target to treat OS under trials or recently reported as a potential target for thiazolidone com-pounds. These results suggest that (R)-8i might be a potential drug candidate for OS treatment.

Keywords: osteosarcoma,phenotypic screening, thiazolidones, Inhibitor, Proliferation

ID: MCDD2021_20004

Title: Bioinformatics Based Virtual Screening of Novel Antimicrobial Peptides from Byasa mencius

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Abstract

Antimicrobial peptides (AMPs) are small, cationic molecules that exhibit potent and wide-spectrum

biological activities against pathogenic microbes, and therefore are considered to be potential drug candidates. As effector molecules of the innate host defense, AMPs are crucial to all organisms, especially for invertebrates, due to the lack of acquired immunity. In this study, a bioinformatics-based strategy combining high-throughput RNA-seq analysis, transcriptome assembly and annotation, and sequence alignment were carried out to discover the novel AMPs of *Byasa mencius*. As a result, a total of 8 novel AMPs were identified from the transcriptome *Byasa mencius*, and were subclassified as cecropins, attacins, and gloverins subsequently according to the sequential and structural features. The sequence of the discovered AMPs are highly conservative in the *Lepidoptera* order, which suggested suggest application prospects that deserve further studies. However, as AMP sequences that were commonly found in other *Lepidopteran* speicies, there was no defensin, lebocin, or moricin found in the AMP repertoire of *Byasa mencius*, which indicate a potential susceptibility for infection. In conclusion, we discovered a series of AMPs through in *silico* approaches, which are of importance for future studies.

Keywords: antimicrobial peptide, *Byasa mencius*, virtual screening, bioinformatics, drug discovery

ID: MCDD2021_20005

Title: Whole genome sequence of actinobacteria isolated from mangroves reveals the secondary metabolite production potential

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Abstract

Mangroves are extreme inter-tidal environments that contain diverse microbial communities. They are characterized by periodic tidal flooding, strong winds, and strong ultraviolet radiation. The unusual habitats where these microbes live may have enabled them to develop unique metabolic systems with enormous secondary metabolite-producing capacities over their long evolutionary histories. As we reported in our previous study, the Actinobacteria sourced from mangroves contain a great number of biosynthetic gene clusters with an unknown potential to produce secondary metabolites, as well as antibiotics, too. Thus, in the present study, we report on our continued investigation of potential secondary metabolite production by Actinobacteria from this special habitat. For this purpose, a strain of Mycobacterium saopaulense (Actinobacteria phylum) from the mangroves in Macau was selected for whole genome sequencing and tandem mass spectrometry analysis. The results showed that the 5,376,881-bp genome from this strain contains 5,391 protein-coding genes and a coding density of 90.53%. The main participating KEGG pathway was "Metabolism". Altogether, the 81 gene clusters identified in its genome were associated with the production of 23 secondary metabolites. Sixteen of them were classified as antibiotics and three of them as bioactive compounds. Furthermore, two of the predicted secondary metabolites from the fermentation process were clavulanic acid and streptomycin. Both of these antibiotics were first found to be produced by M. saopaulense strain. This study shows that mangrove environment hosts Actinobacteria capable of producing bioactive secondary metabolites that can be used in biotechnology applications such as antibiotic production.

Keywords: Mycobacterium; mangrove; whole genome; gene cluster; secondary metabolite; mass spectrometry

ID: MCDD2021_20100

Title: Studies on the Novel Cyclopeptide Alkaloids of *Justicia procumbens* L.

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Abstract

Justicia procumbens L. (Acanthaceae), known as "Juechuang" in China, is a commonly used traditional

herbal medicine embodied in Chinese Pharmacopoeia, with clinical effects of reducing fire, removing toxic heat. The whole plant of J. procumbens mainly distributed in South China and Taiwan has long been used to treat cold, fever, cough, pain, inflammation and cancer, etc. In our previous study, several arylnaphthalide lignans showing cytotoxic and antivirus activities as main constituents of this plant, and a few flavonoids, triterpenes, coumarins have been reported. Our previous phytochemical studies on this plant have afforded four previously undescribed cyclopeptide alkaloids, justicianene A-D. Cyclopeptide alkaloids are defined as polyamidic basic compounds found in many higher families of plants, mainly from genera of the family Rhamnaceae, and usually composed of a tyrosine-derived 4 (or 3)-hydroxystyrylamine moiety, a common amino acid as a ring-bonded amino acid residue, and a ß-hydroxy amino acid unit connected to the styryl fragment via an ether bridge. Attached to the amino group of the latter component is a side chain, usually a peptidogenic amino acid with an N-mono-methyl or N,N-dimethylated terminus. To our best knowledge, the isolation and characterization of cyclopeptide alkaloids with 14-membered rings have never been described in previous publications in plants of the family Acanthaceae. Based on the binding sites of M2 proton channel protein, hemagglutinin protein, neuraminidase and nonstructural protein, cyclopeptide alkaloids were docked and evaluated the binding of molecules and receptors by "consisitency" score to discovery inhibitors and targets of H5N1. The molecular dynamics (MD) analysis of the new compound justicianene A and H5N1 neuraminidase complex was carried out based on the evaluation of binding conformation, localization, binding mode and scoring consistency. The average structure and the ligand conformation in the crystal structure were superimposed, and the interaction mode of justicianene A-NA was obtained, which showed that the time-dependent root mean square deviation (RMSD) value of justicianene A remained around 1.2 Å during the MD simulation, justicianene A was entrapped into the cavity of site 1, where the phenylalanine moiety formed stable hydrophobic packing with side chain of residue Arg156, the alternative H-bonds between Glu277 (98% occurrence)、Arg292 (61% occurrence) and Lys350 (31% occurrence) and the fragment tyrosine were considered to be an anchor for the binding of tyrosine fragment into site 1 pocket. Our findings may provide valuable information for further structural modification and development of highly potent allosteric inhibitors of NA.

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Title: Two Birds One Stone: 14-3-3 ζ blocker inhibits both GPIb signaling and αIIbβ3 outside-in signaling in platelets

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Abstract

Background: Platelet-mediated thrombosis is one of the leading factors for cardiovascular disease. GPIb-IX and integrin α IIb β 3 are two major receptors on platelets that work synergistically for platelet adhesion, activation and aggregation. It has been widely accepted that the adaptor protein 14-3-3 ζ binds to the cytoplasmic domain of GPIb and regulates VWF-mediated GPIb-IX signaling transduction. Our recent study discovered that 14-3-3ζ synergizes c-Src to integrin-β3, and forms 14-3-3ζ-c-Src-integrin-β3 complex during platelet activation, therefore plays an important role in regulating α IIb β 3 outside-in signaling (Blood, 2020). This motivated us to explore whether the 14-3-3ζ blocker inhibits both GPIb-IX signaling and α IIb β 3 outside-in signaling simultaneously, and has a high potential in suppressing platelet-mediated thrombus formation under physio-pathological shear flows.

Methods: The effect of 14-3-3 ζ blocker R18 on GPIb-IX-mediated platelet agglutination and α IIb β 3-mediated platelet aggregation was tested in aggregometer. The effect of R18 on platelet spreading was evaluated with platelets from both wild type and GPIbα-deficient mice. The interaction of 14-3-3ζ with

the cytoplasmic domain of GPIbα or integrin-β3 in the presence or absence of R18 was detected by co-immunoprecipitation. The effect of R18 on fibrinogen/fibronectin binding and platelet degranulation (CD62P expression) were measured by flow cytometry, while αIIbβ3-mediated outside-in signaling transduction was detected by western blot. The anti-thrombosis formation effect of R18 was evaluated in ex vivo perfusion chamber model under either low (300s-1) or high (1800s-1) shear forces.

Results: Blocking 14-3-3ζ with R18 significantly inhibited both GPIb-IX-mediated platelet agglutination, and αIIbβ3-mediated platelet aggregation and spreading in vivo. R18 inhibited the interaction of 14-3-3ζ with the cytoplasmic domain of either GPIbα or integrin-β3, and suppressed αIIbβ3 outside-in signaling without significantly affecting soluble fibrinogen/fibronectin binding to platelets. R18 also showed an inhibitory effect on agonists-induced platelet degranulation. In collagen-coated perfusion chamber assay, R18 showed a higher potential than eptifibatide in suppressing platelet-mediated thrombus growth under both low (300s-1) and high (1800s-1) shear conditions.

Conclusion: These data further proved that 14-3-3ζ plays critical roles in both GPIb and αIIbβ3-mediated platelet activation/aggregation. Targeting both GPIb signaling and αIIbβ3 outside-in signaling by 14-3-3ζ blocker may be a promising strategy for the treatment of thrombosis-related cardiovascular disease.

Disclosure: No relevant conflicts of interest to declare.

Part V Instructions for Presentations

Oral Presentation

Devices Provided by the Conference Organizing Committee:

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

Materials Provided by the Presenters:

- PowerPoint or PDF files

Duration of each Presentation:

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

Poster Presentation

Materials Provided by the Conference Organizing Committee:

- X Racks & Base Fabric Canvases (60cm×160cm, see the figure below)
- Adhesive Tapes or Clamps

Materials Provided by the Presenters:

- Home-made Posters

Requirement for the Posters:

- Material: not limited, can be posted on the Canvases
- Size: smaller than 60cm×160cm
- Content: for demonstration of the presenter's paper

Part VI Hotel Information

About Hotel

Kunming Jin Jiang Hotel (昆明锦江大酒店) is recognized as one of the most distinguished deluxe hotels in Kunming, an area rich with Yunnan minority culture and warm hospitality. Situated in the heart of the commercial and trade center, the hotel is within walking distance of Jewelry City and both the Kunming International Trade Center and Foreign Trade Center. There are 320 well-appointed guestrooms, seven deluxe restaurants and conference and banquet facilities. With its high-quality service standard, the hotel is ideal for both business and leisure travelers alike.

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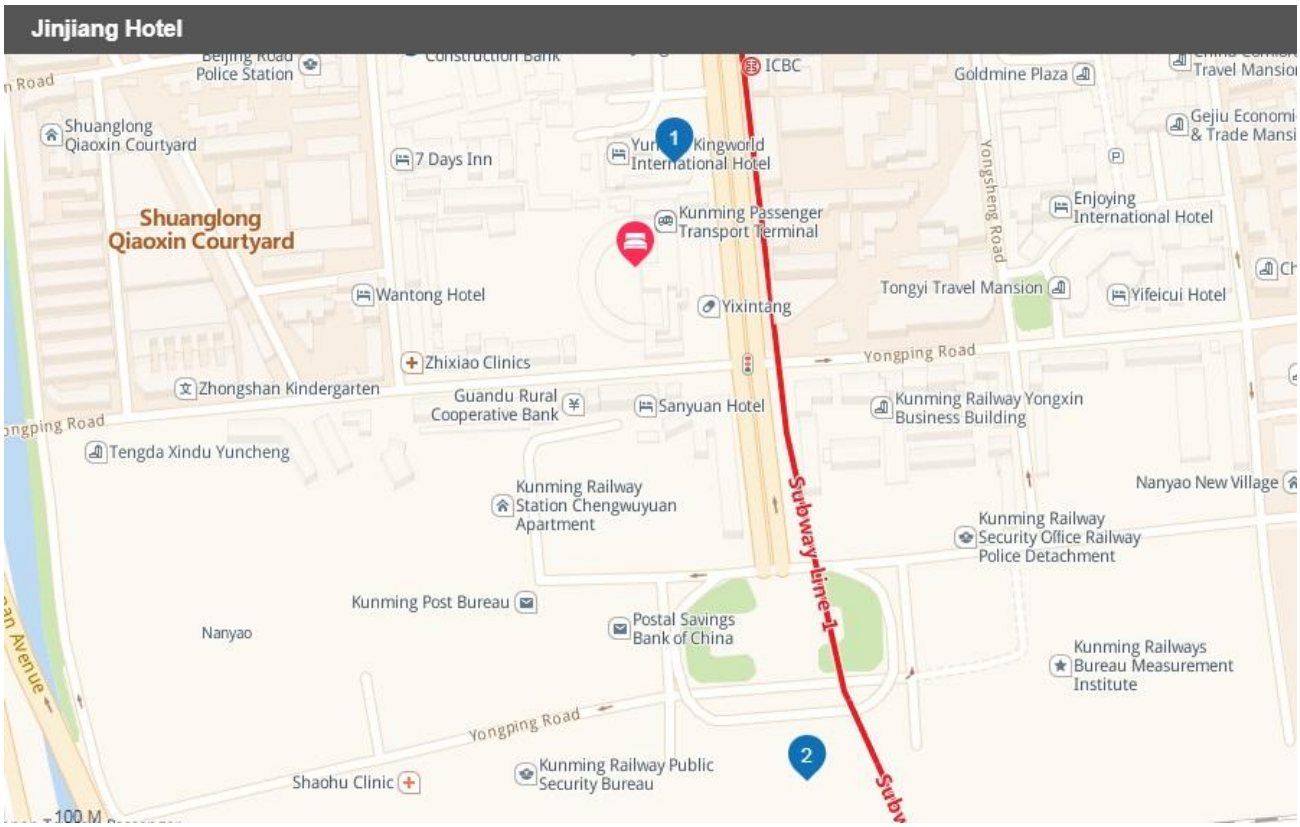

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