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ORGANIC CHEMISTRY

OCTOBER 24-25, 2024

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Thank You All

WELCOME MESSAGE

Thomas J. Webster
Hebei University of Technology
USA

A warm welcome to the World Congress on Organic Chemistry (WCOC 2024) in the beautiful city of Paris, France. We all know that chemistry is everywhere ! Chemistry is in our water, food, energy sources, sensors, batteries, catalysts, medicine – pretty much everything. So no matter what your interests, what a better topic to keep abreast about than chemistry ! In addition, so much is happening in chemistry today. Nanotechnology, metal organic frameworks (MOFs), new polymers, biodegradable metals, self-assembled chemistries, macromolecules, picotechnology and so much more are pushing the boundaries of chemistry in ways previously unimaginable. What can't chemistry do ! WCOC 2024 will provide you the opportunity to learn about the latest and greatest in chemistry, and will stimulate your thinking on what is next in organic chemistry whether for medicine, combating global warming, or helping to explore space.

Or for figuring out why the bagels from Paris are the best in the world !

I look forward to seeing you in Paris.

Thomas J. Webster

WELCOME MESSAGE

Vladimir Voronov
Irkutsk National Research
Technical University
Russia

On behalf of the Scientific Committee, I would like to extend a warm welcome to all participants of the World Congress of Organic Chemistry (WCOC 2024) in the wonderful Canadian city of Paris. In my opinion, the congress in which you are a participant should become a notable scientific event. In this regard, it is appropriate to note the extensive topics of the scientific sections, covering a wide range of issues from various branches of chemistry and its applications. I would also like to note the inclusion of the section “Physical Methods in Organic Chemistry” in the scientific program of WCOC 2024. Indeed, the successful solution of virtually any chemical problem is very often determined by the level of knowledge about the molecular structure of chemical reagents. But it is the physical (primarily spectral) methods of research that make it possible to obtain such knowledge. I wish you pleasant and productive communication with your colleagues. I also you enjoy your stay in Paris. We are enthusiastic about your participation hope in WCOC 2024. We hope that it will contribute to your further creative growth.

Vladimir Voronov

IN - PERSON

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Eric Buhler

University Paris Cite
France

Heterodyne laser correlation Spectroscopy: An interferometric method for measuring nanoparticle velocity

Abstract:

In a flowing solution of motorized nanoparticles, propelled objects undergo both directed flow and random diffusion, and equations for forced diffusion can be used to describe this situation. Dynamic laser light scattering (DLS or photon correlation spectroscopy) is a well-established technique for measuring particle size over the size range from few nanometers to few micrometers and a technique of choice for studying the dynamics of solutions and in particular diffusive processes due to Brownian motion. However, the average drift velocity of particles, in a directed flow is inaccessible in a standard homodyne DLS experiments. The study of ballistic motions or forced diffusion requires advanced heterodyne DLS experiments. In such experiments a reference beam, which is a small fraction of the intensity of the incident laser light, is mixed with the light scattered from the sample, allowing measurement of dynamical structure factors characterized by both real (diffusion) and complex (ballistic velocity) processes. Important. The heterodyne intensity-intensity correlation function, g(2)(q), is an oscillating function of the time lag with a velocity-dependent frequency that requires complex analyses and comparison with theoretical models. Such recent optical setup and method recently enabled us to study complex motions of active nanoparticles.

Biography

Eric Buhler currently holds a Full Professor position in soft condensed matter physics at Universite Paris Cite (France). In 1996, he received his Ph.D. degree in physics at the University of Strasbourg investigating the structural and dynamical properties of wormlike micelles. Prof. E. Buhler subsequently obtained a postdoctoral position (1996-1998) at the University of North Carolina at Chapel Hill (USA), where he studied the structural behavior of copolymers in supercritical carbon dioxide using scattering techniques. In 1998, he joined the University of Grenoble, France, where he obtained an Associate Professor position (1998-2006). He spent two years (2002-2004) at the French National Research Center (CNRS) of Montpellier (Charles Coulomb Institute) as a Visiting Professor. In 2006, he joined the Universite Paris Cite, where he is currently a Full Professor. His research focuses on the structure and dynamics of complex systems. He is specialist in laser light, neutron and X-ray scattering as well as in photon correlation spectroscopy. He has published more than 80 research articles in peer review journals.

Koichi Shimizu

Xidian University
China

Suppression of scattering effects for macroscopic imaging of physiological functions in animal bodies

Abstract:

The absorption of near-infrared light in animal tissues is relatively lower than at other wavelengths, allowing deeper penetration and enabling real-time transillumination imaging. Additionally, by leveraging the spectral characteristics of biological components such as hemoglobin, functional imaging of physiological information within the body becomes feasible. However, near-infrared light undergoes strong scattering in tissues, leading to significantly blurred trans-body images. To address this issue, we have developed several scattering suppression techniques. For instance, the near-axis scattered light component can be extracted from the diffused light transmitted through tissues, deconvolution using the point spread function for scattering, and image restoration with deep learning. We validated the efficacy of these methods in various experiments, including: trans-body imaging of mouse digestive organs following a normal diet, visualization of blood flow changes in mouse kidneys, visualization of activated areas in the rat cerebrum following somatosensory stimulation, visualization of veins in human hands and feet, artery-vein differentiation in trans-body images of the human forearm, and imaging of blood flow changes in human hands in response to mental stimuli. These results demonstrate that applying scattering suppression techniques to near-infrared trans-body imaging enables safe, non-invasive, and functional imaging through animal bodies.

Biography

Koichi Shimizu received M.S. (1976) and Ph.D. (1979) degrees, from University of Washington, Seattle, USA. He was Research Associate in University of Washington 1974-79. He was an Assistant-, an Associate- Professors, and a Professor in Hokkaido University, Sapporo, Japan in 1979-2016. He is currently a Professor Emeritus of Hokkaido University, Japan, an Invited Research Professor of Waseda University, Japan and a Professor of Xidian University, Xi'an, China. He has been engaged in the studies of biomedical engineering. He served as associate editors of IEEE Trans. ITB in 1999–2007 and Advanced Imaging from 2023. He has been a Fellow of the Electromagnetics Academy, and an editorial board member of Scientific Reports, Nature.

Gulgun Cakmak Arslan

Duzce University
Turkey

Exploring the medicinal frontiers: Applications of Fourier Transform Infrared (FTIR) spectroscopy in biomedical investigations

Abstract:

Fourier Transform Infrared (FTIR) Spectroscopy, one of the optical spectroscopic techniques used in biophotonics, has emerged as a powerful analytical tool in biological and medicinal practices in recent years. FTIR spectroscopy, which can be combined with a microscope or Attenuated Total Reflectance (ATR) accessory, is based on analyzing the interaction between infrared light and the molecules in the sample to produce a highly specific spectrum. The resulting spectrum represents a fingerprint that can be used to extract valuable information regarding the molecular vibrations of functional groups and biochemical composition of the sample. The changes in the band intensities/areas of FTIR bands, bandwidths and shifts in the peak positions give important information about the functional groups of biomolecules. This technique allows the scanning of cells, tissues and biofluids in a very short time without introducing any foreign or disturbing probe into the system. It enables precise identification and characterization of biomolecules such as proteins, lipids, nucleic acids and carbohydrates within biological samples. Since the spectral parameters are sensitive to molecular changes caused by pathological conditions, by analyzing them subtle alterations can be discerned in biochemical compositions associated with different disease states. This capability has been used in the diagnosis of various diseases including cancer, diabetes, cardiovascular disorders and neurodegenerative diseases. In this talk, after giving general information about the principles of FTIR spectroscopy, experimental studies of my research group and other researchers will be summarized demonstrating the ability of this technique to detect and characterize pathological conditions in biological tissues.

Biography

Gulgun Cakmak Arslan is an Associate Professor in the Department of Biology at Duzce University, Turkey. She completed her Master's and PhD studies in the Molecular Biophysics Laboratory at the Middle East technical University. She published more than 20 papers, receiving more than 750 citations, related the use of various spectroscopic techniques including FTIR spectroscopy in the biological and medical materials. In recent years, she studies on the investigations of the effects of ionizing radiation and different toxic/antioxidant substances on biological tissues and membranes, oxidative stability of edible oils under storage and cooking conditions, protein structure, function and stability.

Felix N. Chukhovskii

Institute of Applied Mathematics and Automation KBSC RAS
Russia

State-of–the art of the X-ray diffraction fractional optics theory: Matrix integral equations. The green function method

Abstract:

Up to now, developing theory of the X-ray diffraction by distorted crystals remains to be actual. The X-ray theory based on the equations with partial derivatives over the two coordinates within the X-ray scattering plane. In the report, the theory based on the first-order fractional X-ray diffraction optics equations with the fractional derivate of the order α (0, 1] has been treated by using the Green function technique (GFT) and they have been converted to the matrix integral Volterra equation (MIVE) of the second kind. The theoretical approach has been elaborated in terms of the GFT. In the case when the incident X-ray beam strikes the crystal surface, the Cauchy problem can be cast in the form of the convolution of the matrix GF and the boundary-value function. In the case of imperfect crystals, the Liouville–Neumann-type series formalism has been applied to solving the Cauchy problems. The matrix Resolvent function solution explicitly has been built up. It has been shown that the fractional parameter α = 1, the X-ray diffraction fractional optics equations have been formulated in the terms of the MIVE of the second kind. In some cases of the crystal-lattice defect field function (DFFs), Resolvent solutions of the Cauchy problem have been built up. To precise the parameter α of the X-ray diffraction fractional optics is of fitting the theoretical model with observed 2D imaging data. One has discussed the problem of recovery of the Coulomb-type point defect in a crystal by computer X-ray diffraction technique.

Biography

Felix N. Chukhovskii has completed his PhD at the age of 24 years from Engineer-Physics Institute Moscow postdoctoral studies from Kurchatov's Energy Institute Moscow. He is the leader scientist of Institute of Applied Mathematics and Automation KBSC RAS, Shortanov Str., 89A, Nal'chik 360000, Russian Federation. He has published more than 200 papers in reputed journals.

Jens Bliedtner

Ernst-Abbe-University of Applied Sciences Jena
Germany

Functionalization of surfaces to create partially conductive structures with short and ultrashort pulse laser radiation

Abstract:

This article examines the potential and possibilities of a new laser-based process (LSA) for the selective metallization of three-dimensional circuit carriers. The polymer substrates can be used without additional metal fillers in the matrix, thus saving costs and resources. The area of application extends to injection-molded and additively manufactured plastic components. The process is divided into the process steps: surface activation due to laser structuring (1), nucleation of palladium on these surfaces (2) and electroless copper plating of the activated areas (3). Experimental investigations with three pulse duration from nanoseconds to femtoseconds are presented. These differ in the selected laser and pulse parameters. By varying significant process variables, interaction processes are analyzed which have a decisive influence on the subsequent activation, nucleation and metallization. The focus is on discussing the influencing parameters for generating partially conductive structures. As a result, exemplary process windows for polybutylene terephthalate and polyamide are shown. The important target values electrical resistance and the mechanical layer properties are also characterized. The newly developed process offers great potential for the dynamic and individualized production of electrically conductive structures on plastic components.

Biography

Jens Bliedtner studied precision engineering at the Friedrich Schiller University in Jena. He wrote his doctoral thesis in the fields of development of pulsed laser systems and special methods in macro material processing. Since 2000, Bliedtner has been a professor at the Ernst Abbe University of Applied Sciences in Jena and the head of the department production engineering and automation of production processes. Currently, he is working in the research fields of optical technology, laser material processing and additive manufacturing.

IN - PERSON

ORAL PRESENTATIONS

OCTOBER 24-25, 2024

Tsaplin Grigory

Mendeleev University of Chemical Technology
Russia

Development and design of new 1,2,4-triazole-1-ylmethylazoles- modern highly effective fungicides

Abstract:

In modern medical chemistry and agrochemistry, drugs for the treatment of fungal diseases occupy a special place. The most common and effective class are azoles having the pharmacophore group imidazole or 1,2,4-triazole. They have a systemic effect and low toxicity. Azoles inhibit lanosterol alpha-demethylase (CYP51Y) and disrupt the permeability of the fungal cell membrane. They are used in clinical practice and are among the top 200 best-selling medicines. The current work is devoted to the development of a new design of azoles for the treatment of fungal diseases based on 1,2,4-triazole-1-ylmethylazoles with a characteristic change in the structure of active substances from branched to elongated type. Methods for obtaining new series of compounds have been developed and their high efficiency in biological tests in vitro has been shown. This report covers the work result over the past 5 years.

Biography

Tsaplin Grigory has completed his PhD at the age of 30 years from Mendeleev University of Chemical Technology (MUCTR). He is the assistant at department of chemistry and technology of organic synthesis of MUCTR. He has published more than 28 papers in reputed journals and 5 RU patents.

Amy Stevens

University of Saskatchewan
Canada

Probing the photophysics of azulene compounds with ultrafast lasers

Abstract:

In plant light-harvesters, large numbers of chlorophyll chromophores work in tandem to absorb and transport photonic energy quickly and efficiently to the plant's reaction centre. These molecules avoid concentration quenching and other deleterious effects due to the presence of protein scaffolds that precisely control their relative distance and orientation. This has inspired our studies into tuning molecular coupling, such that biexcitonic energy-transfer pathways are preferably accessed, in aromatic ring structures. We have focused on molecular upconversion and singlet fission as these modes of energy transfer have the potential to transform the light-collection and energy-transfer efficiencies of solar-harvesting devices. Molecular upconversion allows for the absorption and transformation of otherwise-wasted near-infrared solar radiation, while singlet fission multiplies the available photoexcitations. Recently, we have controlled molecular upconversion in metalloporphyrins using polymers as scaffolds and probed the resulting dynamics with ultrafast spectroscopic techniques, such as fluorescence upconversion. The rigidity of the polymer backbone and the distance between the pendant porphyrins played a dominant role in the overall upconversion efficiency. Singlet fission is less well understood than the upconversion process. Hence, we are exploring the potential of azulene derivatives, such as calix[4]azulene, to be a new class of singlet-fission materials. This will help us to unravel the precise energy-transfer mechanism involved and design improved singlet-fission materials.

Biography

Amy Stevens is a assistant professor in the Chemistry Department in the University of Saskatchewan. My background and expertise lies in ultrafast spectroscopy. I received a PhD from Oxford University and undertook a postdoc at the Max Planck Institute for Structure and Dynamics of Matter/University of Toronto. My postdoctoral work focused on two-dimensional femtosecond electronic spectroscopy of light-harvesting complexes. My current research group follows two main themes. We are primarily interested in probing energy transfer and charge transfer in conjugated. Our other research theme is based on controlling molecular interactions with DNA origami scaffolds.

Anton Klimonov

Mendeleev University of Chemical Technology
Russia

Some anrorc type reactions in the chemistry of Five-Membered heterocycles containing three heteroatoms

Abstract:

Heterocycles are a class of organic compounds that contain atoms of elements other than carbon, such as phosphorus, nitrogen, sulfur, or oxygen. These molecules play an important role in the development of pharmaceuticals, as they serve as models for designing new compounds with desired properties. Azoles, which are a group of five-membered heterocyclic compounds containing nitrogen, sulfur, and oxygen atoms as heteroatoms, are known for their exceptional biological activities, include antifungal, anticancer, and anti-inflammatory properties. The main method for producing 1,2,4-triazole-3-thiones is the cycloconden-sation of corresponding N,N'-disubstituted thiosemicarbazides in a basic medium. This process requires the use of thioisocyanates, which are produced in most cases by starting with highly toxic thiophosgene. We have developed a novel approach to the synthesis of targeted compounds through an ANRORC type reaction using 1,3,4-oxadiazoles, 1,3,4-thiadiazoles or 1,2,4-dithiazoles as starting materials. This is a groundbreaking and previously unexplored process of converting one heterocyclic system into another, which allows us to expand the range of compounds with potential biological activity that can be obtained.

Biography

Anton is a 23-year-old PhD student at Mendeleev University of Chemical Technology (MUCTR). He has already published several papers and abstracts in local journals, and has also taken part in international conferences in Russia. His research focuses on the chemistry of heterocyclic compounds with biological activity. In addition to his academic work, Anton speaks English and a little French.

IN - PERSON

POSTER PRESENTATIONS

OCTOBER 24-25, 2024

Elizaveta Bashkalova

Mendeleev University of Chemical Technology
Russia

Synthesis of azole derivatives based on 1,2,3-Dithiazoles with fungicidal activity

Abstract:

Fungicidal drugs are widely used in agriculture and in medical chemistry. Azoles can be attributed to such drugs with a systemic effect. Many drugs include several heterocyclic elements, which makes it possible to enhance the fungicidal effect of the compounds. It is known that 1,2,3-dithiazole derivatives have a wide range of biological activity. For the first time, we obtained compounds based on the initial Appel salt, the structure of which contains both a dithiazole fragment and a functional group of cyanothioanilides, a fragment of the collapse of the heterocyclic ring. The high fungicidal activity of target compounds and intermediate 4-chloro-N-aryl-1,2,3-dithiazole-5-imines was shown in vitro tests vs six species of phytopathogenic fungi.

Biography

Elizaveta is a 5th year student at the Mendeleev University of Chemical Technology and has been actively engaged in the chemistry of heterocycles, in particular azoles, for three years. She has published two scientific papers and actively participates in conferences at various levels.

Yakup Arslan

Duzce University
Turkey

Developing an artificial intelligence model to eliminate unwanted pectoral muscle regions in mammography images used for breast cancer diagnosis

Abstract:

The presence of pectoral muscle regions in certain breast images can lead to inaccurate results when artificial intelligence (AI) models are used for tasks such as cancerous mass detection and breast density classification. The aim of this study is to develop an AI application that can automatically clean pectoral muscle regions in mammography images. We proposed using a machine learning approach to train an AI model to accurately segment the pectoral muscle regions in mammography images. We utilized a dataset of 400 mediolateral oblique (MLO) images from the CBIS-DDSM dataset, which were manually segmented and labeled using segmentation software. These images were used for training a U-Net network, a popular architecture for image segmentation, using Python. The trained AI model was then applied to 1000 MLO images and the predicted pectoral muscle regions were removed. Manual checks and corrections were performed on these images to obtain a large training dataset for further training. With the augmented training dataset, the final AI model was trained using the U-Net network. Evaluation using the intersection over union (IoU) ratio showed over 80% overlap between predicted and manually segmented regions, indicating successful pectoral muscle removal. The model's performance suggested its potential for automatic pectoral muscle eliminate in breast imaging. In conclusion, our study demonstrated that it is possible to effectively eliminate unwanted pectoral muscle regions in mammography images using the developed AI model based on the U-Net network.

Biography

Yakup Arslan is a researcher in the Department of Physics at Duzce University, Türkiye. His research areas include the characterization of living tissues, monitoring changes in various biological tissues and designing autonomous systems in these areas by using Electrical Impedance Spectroscopy, Fourier Transform Infrared Spectroscopy and artificial intelligence (AI) techniques. Recently, he has focused on artificial intelligence applications in health. In this context, he is studying to develop an AI model for the purpose of mass and calcification detection and mass classification in mammography images obtained from the Turkish population.

Gleb Markasov

Mendeleev University of Chemical Technology
Russia

Chemistry and biological activity of 5-(1,2,4-triazol-1-yl methyl)-1,2,4-triazol-3-amine derivatives

Abstract:

Currently, azole derivatives are one of the best-selling and effective agrochemicals in the field of combating fungal plant diseases. Azoles inhibit lanosterol alpha-demethylase (CYP51Y) and disrupt the permeability of the fungal cell membrane. In this paper, the previously little-studied chemistry of derivatives of 5-substituted-1,2,4-triazol-3-amine is revealed. The obtained substances can be used to create antifungal drugs of systemic action. Methods for obtaining new series of compounds have been developed and their high efficiency in biological tests in vitro has been shown.

Biography

Gleb Markasov graduated with a bachelor's degree in 2021 and a master's degree in 2023. Currently, he is a 1-year PhD student at Mendeleev University of Chemical Technology of Russia (MUCTR). His scientific interests are the chemistry and biological activity of azole derivatives. During his studies and work, he published 2 RU patents and 1 article.

IN - PERSON

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Mariia Zhuldybina

ETS Higher Technology School
Canada

Terahertz spectroscopy for NDT in printed electronics

Abstract:

Recent advances in printed electronics (PE) highlight the need for efficient, in-situ, non-destructive quality control methods to ensure the reliability of flexible electronic devices. Traditional quality control methods such as optical and electron microscopy are effective but slow and limited in scope. This review explores terahertz (THz) spectroscopy as a promising solution for real-time, contactless inspection of printed electronics. By leveraging the electromagnetic properties of THz waves, particularly when paired with metamaterials, the system allows for the precise monitoring of electrical conductivity and geometrical accuracy during high-speed roll-to-roll (R2R) printing. Studies demonstrate that THz-based inspection outperforms conventional techniques, offering more accurate and scalable options for assessing ink distribution, pattern integrity, and conductivity in printed devices. As THz technology continues to evolve, it shows potential to enable closed-loop quality control systems in smart manufacturing environments.

Biography

Mariia Zhuldybina earned her PhD in Electrical Engineering in 2021 from the Ecole de technologie superieure (ETS), Montreal, QC, Canada. She is currently an institutional researcher in the Electrical Engineering Department at ETS, where her research focuses on advanced terahertz spectroscopy and its applications for development of 6G communication. Before joining ETS, she worked at the Institute of Graphic Communications and Printability (ICI), a leading research center specializing in scaling up printing technologies for industrial applications. During her time at ICI, she gained extensive expertise in printing techniques such as inkjet, flexography, and screen printing. In addition to her research, Mariia is the co-founder of TRAQC, a startup dedicated to integrating AI-assisted terahertz measurement systems into manufacturing lines for quality control.

VIRTUAL EVENT

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Pangkuan Chen

Beijing Institute of Technology
China

π-Conjugated B/N-Doped luminescent materials with chiroptical properties and Open-Shell character

Abstract:

Synthetic organic dyes with low-energy absorption and emission properties, especially in the red-to-near-infrared (NIR) region are used as photodetectors and laser filters in optoelectronics and medical applications. However, this type of organic materials have rarely been reported in the literature. The incorporation of main group elements (such as B, N, P and Si) into organic systems has been established for decades to achieve functional modifications of organic π-conjugated materials. Those B/N-doped main-group compounds have particularly attracted considerable research interests due to notable contribution to the electronic properties. New chiroptical materials with circularly polarized luminescence (CPL) have recently found numerous applications in photonics, smarting sensing and (bio)imaging as well as information technology. As part of our pursuits of organoborane chemistry in our group, this work will focus on the molecular design, synthetic methodology and characterization of organoborane macrocycles and CPL-active materials with emission in the red-to-NIR region and with the open-shell characters.

Biography

Pangkuan Chen has completed his PhD in 2012 from Rutgers University with Prof. Frieder Jakle, and then post-doctoral studies at MIT with Prof. Niels Holten-Andersen. He is the full professor of Beijing Institute of Technology, where he also serves as the director of Beijing Key Laboratory of Photoelectronic/Electrophotonic Conversion Materials. He has published more than 60 papers in reputed journals. His current research builds on organoborane chemistry, π-conjugated macrocycles, Near Infrared (NIR) circularly polarized luminescence, chiral radical chemistry and dynamic B/N Lewis pairs.

Shulin Sun

Fudan University, China

High-Efficiency and multifunctional controls of lights with gradient metasurfaces

Abstract:

Manipulating light in the desired manner is highly desired in photonics research. Recently, gradient metasurfaces, consisting of carefully designed inhomogeneous microstructures with carefully tailored optical responses, were found to exhibit strong abilities to control light propagations, leading to amazing physical effects such as anomalous refraction/reflection, surface plasmon coupling, flat meta-lens, meta-hologram, special beam generations. In this talk, we will introduce our recent progresses along this direction, and in particular the concepts and applications for realizing the high-efficiency and multi-functional controls of the lights in far-field and near-field regimes.

Biography

Shulin Sun has completed his PhD from Fudan University and Postdoctor from National Taiwan University. He is currently a full professor and associate dean of the Department of Optical Science and Engineering at Fudan University. He has published more than 80 papers in international journals in international journals, including Nature Materials, Nano Letters, Advances in Optics and Photonics, Light: Science and Applications, which are totally cited over 9100 times so far. Thirteen papers are elected as ESI highly cited paper. He won the Second Prize of National Natural Science Award in 2019, the Rising Star of Light in 2020, the Highly Cited Chinese Researchers in 2020, 2021, 2022.

VIRTUAL EVENT

ORAL PRESENTATIONS

OCTOBER 24-25, 2024

Bo Liu

Institute of Optics and Electronics
China

Advance of daytime working single photon lidar

Abstract:

Single-photon lidar has extremely high sensitivity and is widely used in various remote target detection scenarios. Compared with traditional linear detection, it can obtain a longer detection range under limited volume, weight, power consumption and other resource envelope. For the single-photon lidar system, the improvement of detection ability depends on the suppression level of background noise. Especially for the single-photon lidar system working in the daytime, the background noise caused by sunlight is the main influence limiting the detection ability of the system. In this paper, the latest progress of single-photon lidar in daytime working is introduced. Through a series of effective background light suppression techniques, the detection ability of the system in daytime is greatly improved, and the detection effect is equivalent to that at night. In addition, in order to evaluate the "return on investment" performance of a lidar system, a normalized evaluation model, so called the ROI index is also proposed, which can intuitively evaluate the "economic" performance of lidars.

Biography

Liu Bo is from Institute of Optics and electronics, CAS. He is the deputy director of Key Laboratory of Space Optoelectronics Precision Measurement Technology, CAS, also the member of teaching Committee of School of Optoelectronics, University of Chinese Academy of Sciences, and keynote professor. Liu has been serving as a Lidar Scientist of the University of Wyoming (USA), responsible for the on-board atmospheric detection Lidar systems on the KingAir aircraft. Liu has led and completed various research and development projects related to lidar systems. Currently, his main focus is on long-distance single-photon detection and active-passive composite detection.

Spyridon Mourtas

University of Patras
Greece

The use of Solid-Phase synthesis in the development of Thiol-Containing peptides and Peptide-Based drugs

Abstract:

Sulphur plays an important role in many biological processes and therefore many pharmaceuticals contain this atom. Therefore, the development of methods for the synthesis of thiol-containing compounds/building blocks and the introduction of sulfur atom into peptide sequences is a useful approach towards the development of thiol-containing peptide-based drugs. To this end: (a) we developed easy and efficient methods for the synthesis of mercapto acids, aminothiols, thiol-containing amino acid derivatives and building blocks of interest, and (b) we developed various solid-phase synthesis methodologies (step-by-step and convergent synthesis methods), using trityl-type resins, for the introduction of the synthesized thiol-containing compounds into peptide chains, the replacement of the amide bond with the methylenethio isoster, the synthesis of thiol-containing peptoids, and the synthesis of 2-benzothiazolyl-containing compounds and peptides.

Biography

Spyridon Mourtas was born in 1976 in Athens. He received his PhD in Organic Chemistry from the University of Patras, Greece in 2008. He has gained extensive experience in chemical/pharmaceutical industry and as a postdoctoral researcher in several national/international projects. Currently, he is an Asst. Prof. at the University of Patras, Greece. His interests are focused on organic synthesis and organic synthesis methodologies (including solid-phase organic synthesis) of small molecules, peptides, modified peptides, bioconjugates, etc. with potential biological interest. A major part of his work is related to the chemistry of thiol-containing compounds and their further utilization in the development of pharmaceuticals and nano-based pharmaceuticals. So far, he has published more than 45 papers in reputed journals. H-index 25.

Arianna Gelain

University of Milan
Italy

Repositioning of heterocyclic derivatives as sirtuin 5 activators

Abstract:

Sirtuin 5 (SIRT5) is a nicotinamide adenine dinucleotide (NAD+)-dependent enzyme belonging to HDACs family, primarly present in mitochondria. Besides to the deacetylase activity, SIRT5 catalyses the desuccinylation, demalonylation and deglutarylation in particular of negatively charged acyl lysine residues. SIRT5 modulates the activity of various enzymes involved in the metabolism of ammonia and glucose, the amino acid degradation, the electron transport chain and apoptosis, contributing to maintain cellular redox homeostasis and to control ROS levels. Furthermore SIRT5 dysregulation has been related to different pathologies as metabolic disorders, cardiovascular and neurodegenerative diseases, infections, cancer and to the modulation of the inflammatory response. Since drug repositioning is considered among the effective tools in developing potentially active molecules, with the aim to discover novel SIRT5 activators, we applied this approach to our in-house library compounds. Their biological evaluation led to the identification of some heterocyclic derivatives endowed with SIRT5 activation but not exhibiting antiproliferative activity. The most significant data will be proposed.

Biography

Arianna Gelain is Assistant Professor at University of Milan, Faculty of Pharmacy. She graduated in Pharmaceutical Chemistry and Technology and obtained the Ph.D. in Medicinal Chemistry at University of Milan. Her scientific activity concerns the design, synthesis and the related structure-activity relationships studies of novel small molecules as signaling pathway modulators (in particular STAT3 inhibitors) and potential antimicrobial (antitubercular, anti-biofilm and antimalarial) agents. She is author and co-author of 60 scientific publications in peer reviewed and SCOPUS indexed international journals, one chapter book and over 60 contributions (oral and poster communications) presented at national and international congresses.

Sivamani Selvaraju

University of Technology and Applied Sciences
Oman

Microplastics in drinking water and agricultural Soils: Assessing contamination sources, risks, and mitigation strategies

Abstract:

Microplastics, defined as plastic particles smaller than 5 millimeters, originate from the degradation of larger plastics or are intentionally produced for industrial uses. Their widespread presence in aquatic and terrestrial environments raises significant ecological and health concerns, with detection in oceans, rivers, soils, and even drinking water and food supplies. Microplastics pose risks to marine and terrestrial ecosystems, potentially causing harm to aquatic life and disrupting soil health, which can lead to reduced agricultural productivity. Additionally, their ability to absorb harmful chemicals raises serious concerns about human health risks through contaminated water and food consumption. Detection and monitoring of microplastics face challenges due to the lack of standardized methods and variability in sample preparation, complicating accurate assessments. Advanced techniques, such as microscopy and spectroscopy, are employed, but inconsistencies in detection limits and interference from organic materials persist. Mitigation strategies include advanced water treatment technologies, sustainable agricultural practices, and robust policy measures aimed at reducing plastic use. Educating the public and raising awareness are crucial for fostering responsible practices and promoting alternatives to plastics. In conclusion, addressing the pervasive threat of microplastics requires a multifaceted approach that integrates research, policy frameworks, and community engagement. By prioritizing these efforts, we can effectively mitigate the impact of microplastics in our ecosystems, ultimately protecting both environmental and public health.

Biography

Sivamani Selvaraju has completed his PhD in Chemical Engineering from Anna University, Chennai, India. He is one of the top researchers in the University of Technology and Applied Sciences, a premier public University in Oman. He has published more than 150 papers in reputed journals and has been serving as a reviewer in many journals of repute.

Hideyuki Kanematsu

National Institute of Technology
Japan

Anti-Biofilm coating with ionic liquids

Abstract:

This study aims to investigate whether the application of ionic liquids on the surface of materials can inhibit biofilms. Many ionic liquids are known to exhibit antimicrobial properties. On the other hand, biofilm properties are still poorly understood. Biofilm is a film-like substance formed by bacteria, water, and EPS, and its formation on material surfaces causes material deterioration and reduced machine performance. This occurs because when bacteria on the material's surface reach a specific concentration, they expel the polysaccharide all at once, which can be seen to correlate to some extent with antimicrobial properties. This led us to believe that the higher the antimicrobial property, the higher the anti-biofilm property. Previously, our laboratory has shown that mixing small amounts of several ionic liquids in aqueous solution in a loop-type biofilm reactor inhibits biofilm formation. In this study, we investigated the ability of quaternary ammonium salts, ionic liquids used as antimicrobial agents, to inhibit biofilm by mixing them into an alkoxysilane-based coating and applying it to the material's surface.

Biography

Hideyuki Kanematsu has completed his PhD at the age of 28 years from Nagoya University and investigated surface finishing from the viewpoint of electrochemistry and materials science in Nagoya University, Osaka University and NIT (KOSEN), Suzuka College. He was the former deputy president of the National Institute of Technology, Suzuka College. He has published more than 600 papers in reputed journals and has been serving as an editorial board member of many journals.

Chris Arnatt

Saint Louis University
USA

Development of GPR183 antagonists as Non-Opioid analgesics

Abstract:

Neuropathic pain condions arising from nervous system injuries due to trauma, disease (i.e., diabetes) or neurotoxins (i.e. chemotherapy) are severe, debilitang and difficult to treat. Opioids are widely used to treat chronic pain but limited by severe side effects and strong abuse liability. With over 15-20 million people in the US suffering neuropathic pain and a profound annual economic burden for treatment, there is a high priority for developing novel non-opioid based analgesics. Using unbiased analyses of a rodent model of traumac nerve-injury induced neuropathic pain, our collaborators have found significant increases in several orphan G-protein coupled receptors (GPCRs). We have begun drug discovery efforts on one of these receptors, GPR183. Using a virtual screening approach, we have discovered several novel GPR183 antagonists which inhibit pain in vivo and have begun structureacvity-relaonship studies on them.

Biography

Since starting my own laboratory, my research focus has been on developing small molecules for several key protein targets centering on cancer and stem cell biology. I have been working independently on the G protein estrogen receptor (GPER) since graduate school and my lab is beginning to develop small molecule libraries targeting the receptor. The main focus for the project is elucidating the binding pocket, and exploiting it to develop treatments for several disease states. Specifically, we are working on cancer models and gallstone disease models to validate the utility of targeting GPER.

VIRTUAL EVENT

POSTER PRESENTATIONS

OCTOBER 24-25, 2024

Noha Khamis

Warwick University
UK

Heterocycle-containing Noyori-Ikariya catalysts in asymmetric transfer hydrogenation of ketones

Abstract:

Ruthenium metal plays a significant role in catalysing numerous types of organic reactions. One of these crucial reactions is the asymmetric reduction of ketones that provide building blocks for many commercial drugs. [(η6-arene)Ru(TsDPEN)Cl]) half-sandwich Ru complexes are one of the most competent classes of catalysts for the asymmetric transfer hydrogenation (ATH) of ketone substrates and yield alcohols in high enantiomeric excess (ee).1 The basis of enantioselectivity of this class is initiated from two opposite forces: the attractive force between the positive charge on the hydrogen atoms of the arene ring and the aryl ring of the substrate, and the repulsive force between the SO2 of the TsDPEN group and the aryl ring of the substrate.2 Thus introducing different heterocycle substituents in 1,2-diphenylethylene-1,2-diamine (DPEN) was considered to observe their effect on the enantioselectivity and reactivity of this class of catalyst. Six novel Noyori-Ikariya complexes (1-6) have been synthesised, fully characterized tested in the ATH of ketones, yielding alcohol products with high conversion and ee. Remarkably, several challenging ortho-substituted acetophenone derivatives were reduced in high ee which, in some cases, surpassed those achieved by established catalysts of this class.

Biography

Noha Khamis earned her master's degree from Alexandria University, Egypt, at the age of 26. In 2020, she began her doctoral studies at the School of Chemistry at Warwick University in the UK, focusing on organic and computational chemistry. Throughout her academic career, she has published three papers in prestigious journals.

Barbu Vasilica

University of Galati
Romania

Confocal analysis of some microencapsulated bioactive compounds from vegetables

Abstract:

The current orientations in food intake have seen a transition towards a healthier diet, paving the way for the extraction and identification of new biologically active compounds, with beneficial functions, with synergistic, complementary, or even therapeutic actions, with a considerable focus on well-being and disease prevention. Obtaining and incorporating bioactive-enriched plant extracts into foods can significantly contribute to lowering the risk of specific diseases. Recently, modern biotechnological research provides a superior production of extracts of biologically active compounds, their microencapsulation or coacervation in various food-safe protein and biopolymer matrices that ensure their stability, extend their shelf life and even increase their absorption and bioavailability. The aim of the study was to investigate the morphology and stability of microcapsules of flavonoids and anthocyanins extracted from beetroot, tomatoes, onion, eggplant, black rice, black beans, courgette or pumpkin, obtained by various methods, in different matrices. Confocal analysis was performed by using a Carl Zeiss LSM 710 equipment connected with an Axio Observer Z1 inverted microscope with: diode, Ar, DPSS, and a HeNe-laser. The 3D images were rendered and classified analyzed by ZEN 2012 SP1 software (black edition). The encapsulation technique chosen for bioactive compounds from vegetables is very important because these types of molecules are very sensitive in different industrially obtained food matrices. Nowadays, to be able to protect these important compounds with novel coating and delivery systems, and to control the release profiles during digestion, represents quite a challenge with various applications in the field of functional foods.

Biography

Barbu Vasilica graduated in 1991 from the Faculty of Biology, University of Bucharest. Since 2003 she taught lectures in the Department of Food Science, Food Engineering and Applied Biotechnology at the Faculty of Food Science and Engineering. Associate Professor since 2009. Her professional research activity is oriented towards the microencapsulation of different biologically active compounds from plants and their confocal analysis to obtain functional foods with health benefits. The research work is defined by: 5 books, 88 papers, 14 research projects of which 4 as a manager, patents awarded with Silver Medal at the International Exhibition of Inventions in Geneva.

Senzekile Majolaa

Durban University of Technology
South Africa

Design and synthesis of Indole-Pyrazole derivative with potential anticancer and antidiabetic activity

Abstract:

The bioactivity of indole and pyrazole scaffolds has enticed researchers to further expand the pyrazole library through investigating of new synthetic routes to produce novel indole-pyrazole derivatives. In this study, a multicomponent approach via a 3+2 annulation reaction was used to design and synthesize a novel fused indole-pyrazole derivative, as potential anticancer and antidiabetic agents. The synthesized compound was characterized using Fourier Transform Infrared (FTIR), The Nuclear Magnetic Resonance (NMR) and Time-of-Flight Mass Spectrometer (TOF-MS). Cytotoxicity was examined by performing mutagenicity properties against the S. typhimurium TA 98 and TA 100 strains. The compound did not show any mutagenic properties against the S. typhimurium TA 98 and TA 100 strains and when compared to the control (NaN3) it did not increase the number of revertant colonies. The MTT assay for in vitro cytotoxicity against two human cancer cell lines, lung adenocarcinoma (A549) and hepatocellular carcinoma (Hep-G2), showed the most promising anticancer properties as it had high potency against the cancer cell lines, compared to the positive control drug doxorubicin. The in vitro inhibition of α-amylase and α-glucosidase results, showed excellent inhibition against α-amylase at concentration below 26.6 µg/mL, whereas acarbose had an IC50 value of 208.5 µg/mL. For the inhibitory activity against α-glucosidase the compound, showed no significant α-glucosidase inhibitory activity with IC50 values of 57 µg/mL compared to standard acarbose (55.40 µg/mL), it exhibited strong inhibitory activity against α-amylase. Overall, the compound has potential as an anti-cancer or anti diabetic agent.

Biography

Senzekile Majolaa is a PhD student and part-time lecturer in the Chemistry Department at Durban University of Technology, South Africa. My research interests include organic synthesis, protein-drug interactions and electroanalytical chemistry. My PhD research focuses primarily on the design and synthesis of indole-pyrazole fused derivatives and the development of electrochemical immunosensors to support the treatment of diabetes and cancer. I am the founder of a community engagement called Thokazi Helps, which helps grade 12 students who lack access or are unsure where to start when applying for universities and funding. I am also involved in a community engagement program at Durban University of Technology Chemistry Department, where we help grade 12 students bridge the knowledge gap that exists between high school and the start of higher education. The result is to cover physical CAPS practicals in rural areas throughout KwaZulu-Natal.

VIRTUAL EVENT

ORAL PRESENTATIONS

OCTOBER 24-25, 2024

Vladimir G. Chigrinov

Hong Kong University of Science and Technology
Hong Kong

Azodye photoaligned nanolayers for liquid crystal Devices: Physics and applications

Abstract:

Photoalignment and photopatterning has been proposed and studied for a long time [1]. Light is responsible for the delivery of energy as well as phase and polarization information to materials systems. It was shown that photoalignment liquid crystals by azodye nanolayers could provide high quality alignment of molecules in a liquid crystal (LC) cell. Over the past years, a lot of improvements and variations of the photoalignment and photopatterning technology has been made for photonics applications. In particular, the application of this technology to active optical elements in optical signal processing and communications is currently a hot topic in photonics research [2]. Sensors of external electric field, pressure and water and air velocity based on liquid crystal photonics devices can be very helpful for the indicators of the climate change. We will demonstrate a physical model of photoalignment and photopatterning based on rotational diffusion in solid azodye nanolayers. We will also highlight the new applications of photoalignment and photopatterning in display and photonics such as:

(i) fast high resolution LC display devices, such as field sequential color ferroelectric LCD

(ii) LC sensors, including polarization sensors for polarimetric cameraas

(iii) LC lenses with a variable focal distance

(iv) LC E-paper devices, including electrically and optically rewritable LC E-paper

(v) photo induced semiconductor quantum rods alignment for new LC display applications (vi)100% polarizers based on photoalignment

vii) LC smart windows based on photopatterned diffraction structures

(viii) LC antenna elements with a voltage controllable frequency.

Biography

Vladimir G. Chigrinov is Professor of Hong Kong University of Science and Technology since 1999. He is an Expert in Flat Panel Technology in Russia, recognized by the World Technology Evaluation Centre, 1994, and SID Fellow since 2008. He is an author of 6 books, 31 reviews and book chapters, about 322 journal papers, more than 677 Conference presentations, and 121 patents and patent applications including 38 US patents in the field of liquid crystals since 1974. He got Excellent Research Award of HKUST School of Engineering in 2012. He obtained Gold Medal and The Best Award in the Invention & Innovation Awards 2014 held at the Malaysia Technology Expo (MTE) 2014, which was hosted in Kuala Lumpur, Malaysia, on 20-22 Feb 2014. He is a Member of EU Academy of Sciences (EUAS) since July 2017. He got A Slottow Owaki Prize of SID in 2018. He is 2019 Distinguished Fellow of IETI (International Engineering and Technology Institute). Since 2018 until 2020 he works as Professor in the School of Physics and Optoelectronics Engineering in Foshan University, Foshan, China. 2020-2024 Vice President of Fellow of Institute of Data Science and Artificial Intelligence (IDSAI) since 2021 distinguished Fellow of Institute of Data Science and Artificial Intelligence. Since March 2022 he is A Fellow of National Academy of Technology for his contributions to Information Electrical and Electronic Research.

Rahul Hajare

Sandip University
India

An innovative approach towards the oral cavity

Abstract:

The branch of medicine known as radiology employs medical imaging to identify and treat illnesses that affect both human and animal bodies. X-rays, radiography, ultrasound, computer tomography (CT), nuclear medicine, and magnetic resonance imaging (MRI) are only a few of the imaging modalities that are utilized in medical diagnosis and treatment. Radiography is a widely used diagnosis method; it is more convenient, gives proper results, and is also easily accessible. It even shows minute parts of the bone, hard tissue, and teeth with more details. A descriptive cross-sectional study was done to analyze the knowledge, attitude, and practice of radiography among dentists. The survey was conducted among 100 dentists. It was an online survey using Google Forms. A self-administered questionnaire of 10 closed-ended and open questions was prepared and distributed among dentists through online-based survey forms ("Google Forms"). The responses were collected, tabulated in Excel sheets, and analyzed using SPSS (Statistical Package for the Social Sciences) version 23, and the results were represented in a bar and pie graph. The chi-square test was used to analyze the data entered by density. Thus, the present study has concluded that radiodiagnosis plays a major role in the field of dentistry.

Biography

Rahul Hajare attends the Vedanta Institute in Kolkata. He graduated from Nagpur University with an M.Pharm passed with distinction. He works as an academic at Sandip University. He attends the Hindu University of America as a scholar. He works as a postdoctoral fellow at the Indian Council of Medical Research's Dr. Ramesh S. Paranjape National AIDS Research Institute, which is well-known and highly esteemed worldwide.

Maria Jose Lavorante

Institution of Scientific and Technological Research for Defense
Argentina

Dry weight capacity of polymeric ion exchange membranes by conductometric titration

Abstract:

The polymeric ion exchange membranes are essential components in applications related to energy and environment. Their use in different technologies such as reverse osmosis, electrodialysis, fuel cells, electrolyzers, and redox flow batteries, is an example. Therefore, knowing physical-mechanical properties such as exchange capacity, dry weight capacity, water content, thermal and chemical stability, as well as transport properties, is of foremost importance. The dry weight capacity of a material is defined as the total number of equivalents of exchangeable ions. To determine the value of this property, conductometry can be used, which is employed to analyze ionic species and to observe a chemical reaction by studying the electrolytic conductivity of the reactive species or the resulting products. In particular, conductometric titration is an analytical technique that through measurements of conductivity, allows establishing the equivalent point of a reaction, solution, and system. In practice, this technique consists of the addition of equal amounts of titrant with a burette and after each addition the conductivity is measured. The results permit to plot a graphical representation of conductivity as a function of the volume of titrant added. The graphical representation consists of two lines that intersect at the equivalent point and allows determining the dry weight capacity of the polymer material under study. The developed protocol for conducting conductometric titration will then be presented, which allows for reduced operation times and provides accurate results, as observed from the determinations performed with Nafion® 117 membrane.

Biography

Maria Jose Lavorante is the Head of Research and Development Division of Renewable Energy at the Institution of Scientific and Technological Research for Defense (CITEDEF), Buenos Aires Province, Argentina. Her research interests include water electrolyzers, fuel cells, dark fermentation and conductometric titrations. She is the Head Professor at the Engineer Faculty, at the National Defense University in charge of the subjects Inorganic and Organic Chemistry, Organic, Synthesis and Solids and Colloidal Chemistry. Since 2021, she is the coordinator of the ¨Electrolyzers for industrial use and storage¨ subnetwork of the CYTED network ¨Hydrogen: production and uses in transportation and the electrical sector (H2transel)¨.

Deepak Kumar Singh

VBS Purvanchal University
India

Performance of optical fiber communication link with optical soliton transmission

Abstract:

Fiber optic communication is renowned for its ability to transmit signals at higher frequencies, boasting greater bit rates and larger data capacity compared to copper wire electrical communication. Additionally, it provides enhanced security over long distances, with lower loss and interference. However, various factors are impacting optical fiber transmission performance, such as group velocity dispersion (GVD), attenuation, and nonlinearity including self-phase modulation (SPM), must be considered. Therefore, the concept of "Optical Soliton Transmission," which mitigates dispersive effects, presents a compelling solution. This proposition holds promise for achieving fast and stable optical communication in long-haul systems. Soliton pulses constitute signals capable of traversing extensive distances without experiencing distortion due to fiber nonlinearities. This study delves into the comparative analysis of fiber performance between soliton and non-soliton based fibers. The simulation explores the impacts of group velocity dispersion (GVD), self-phase modulation (SPM), optical soliton formation, and fiber loss. The findings from eye diagram analysis and bit error rate analysis conducted using Optisystem-18 software reveal that fiber systems utilizing solitons exhibit minimal distortion, while non-soliton fiber systems demonstrate noise within the system. This study emphasizes the importance of achieving a balance between group velocity dispersion (GVD) and self-phase modulation (SPM) to generate solitons capable of traversing long distances without distortion. Furthermore, it is observed that the reduction in soliton amplitude is influenced by fiber loss, with this signal decay amplifying over propagation distance.

Sunita Bhagat

University of Delhi
India

Exploration of synthetic strategies and biological assessment: Unveiling the potential of some natural and marine natural compounds of medicinal interest

Abstract:

The need for efficient and practical synthesis of biologically active molecules remains one of the greatest intellectual challenges with which chemists are faced in the 21st Century. Throughout the ages humans have relied on Nature to cater for their basic needs, not the least of which are medicines for the treatment of a wide spectrum of diseases. The synthesis of complex natural products continues to occupy an important position in organic chemistry research, not only because nature provides us with some of the most synthetically challenging molecules that we can ever aspire to synthesize, but also because research in this area frequently drives important breakthroughs in methodology. Structurally complex, biologically active naturally occurring substances of marine origin continue to spur the interest of both chemists and biologists as they demonstrate antiviral, antimicrobial, anti-oxidant, and many more biological activities . This is an important area to work on as the major challenge with the biologically active isolated natural products is their limited availability through natural resources and their isolation is very tedious and time consuming process. Further, they are usually isolated in very small quantities, hindering further studies to establish their biological activities as well as structural modifications and their constant supply from natural sources is problematic or virtually impossible. In addition, chemoselective derivatization of marine natural products themselves is usually quite difficult because of their sensitive and elaborate molecular structures, and access to their structural analogs is severely restricted in many cases. Therefore, chemical synthesis of natural and marine compounds in larger quantities and by sufficient means is necessary to investigate their biological implications and this strategic synthetic methodology is focused in our lab [1,2]. Further, considering significance of fluorine incorporation in heterocycles and taking an overview on their biological activities, synthesis of fluorinated analogues of some natural products is planned. An understanding of mechanism, coupled with knowledge of physicochemical properties affected by fluorine substitution has aided in rational drug design of many pharmaceutical agents. Design , strategic synthesis and significance of target molecules will be presented.

Biography

Sunita Bhagat is Professor, Department of Chemistry, ARSD College, University of Delhi. She has teaching and research experience of about thirty years and has published 55 research papers in various internationaland national journals of repute , authored three books, three book chapters and filed two patents to her credit. She has delivered talks and made presentations in more than forty international and national conferences/ workshops. Currently she is Fellow, Delhi School of Public Health, Institute of Eminence, University of Delhi. She is recipient of many prestigious awards viz. Excellence Awards for Teachers March 2023, University of Delhi, INSA Teacher Award 2017, Chemistry Teacher Award for Excellence in Teaching and Research in 2014 by Coastal Chemical Research Society, Andhra University, Best Chemistry Teacher Award (Undergraduate category) in 2013 by Tata Chemicals, CII, Royal Society of Chemistry. She is carrying out research work actively in the area of Natural Product Synthesis, Fluorine Chemistry, Development of Fluorinating Reagents for Synthesis of Fluorinated Heterocycles of Biological Importance, Fluorination Strategies, Green Chemistry etc. She has been awarded many research projects from DST, SERB, ICMR ,UGC and has supervised eleven Ph.D. students. She reviewer of a number of esteemed journals and member of many professional bodies viz. ACS, OWSD, RSC LONDON, Life Member of CRSI, ISCB, ISCA and IACT.

Vishal Ahuja

University Institute of Biotechnology
India

Essential oils and fatty acids in healthcare

Abstract:

Essential oils and fatty acids are important part of phytochemicals extracted from various plants due to biological activities and pharmacological applications. Different ancient cultures have already described the potential benefits of plants and its products like Ayurveda in India. Even in current time tribal areas are rely on plant-based formulations for healthcare as well as their survival. Efforts by researchers have provided scientific support to the traditional and conventional formulations. Current work was also planned to explore the possible use of some of the plants from Southern India as well as Northern India. The extracts were prepared from plants using solvents of different polarities i.e. proteins, alkaloid, indole, quinoline, and steroidal alkaloids. Extracts with fatty acid and essential oil content have shown significant antimicrobial, antioxidants and anti-inflammatory activities. Mass spectrometric analysis with liquid and gas chromatography identified compounds like decanoic acid, phthalate derivatives oleic acid, andrographolide and sterols etc. The formulation also seems more effective than commercial grade compounds in inhibiting cancer. However, commercialization needs to purify the compounds and screen their combinations against various combinations.

Biography

Vishal Ahuja is an active researcher in the field of biomolecules production and application and waste valorization. He has completed his Masters and PhD from Himachal Pradesh University Shimla (H.P.) India. Post PhD he was also part of a FTT project at CSIR-Indian Institute of Petroleum Dehradun (UK) India. Currently, he is working as an Assistant Professor of Research and Development at Chandigarh University Mohali (Punjab) India. He has published more than 50 manuscripts including research and review articles, chapters, and one edited book. He has reviewed more than 100 articles and active editorial board member for reputed journals like PLOSOne, BMC Biotechnology, BMC Biotechnology for Sustainable Materials, and BioMed Research International.

Orlando Elguera

University of Sao Paulo
Peru

Maser-rays based on synchrotron radiation-total reflection X-ray fluorescence (SR-TXRF)

Abstract:

In 2012, during the experiments performed at LNLS (Brazilian Synchrotron Light Laboratory) based on SRTXRF measurements of Ormosil films containing phosphotungstates ([PW12O40]3-) was observed an image that could be interpreted as the result of the transition from the incident X-ray beam (packets of photons) to a continuous light beam (set of continuous waves). A hypothesis could be based on a summation of small local crystalline domains, resulting in a "continuous beam". Differently of the case of LASER beam, the excitation by synchrotron radiation could generate not only excitation but also ionization of a polyatomic/poly-molecular systems (indeed considering the whole sample), instead of monoatomic system. Thus, the presence of individual MASER (Molecular Amplification by Stimulated Emission of Radiation) beam generated by SR-TXRF could be considered. A MASER produces coherent electromagnetic waves through amplification by stimulated emission (process based on that was argued by Albert Einstein (1916-1917)). In lower ranges of energies than the corresponding to X-rays of electromagnetic spectrum like the Ultraviolet region, the Phosphotungstates molecules exhibit very interesting phenomenon as the photocromism. This phenomenon occurs when the molecules mentioned above are irradiated with ultraviolet light, which brings these molecules to an excited electronic state. The reduced phosphotungstate obtained ([PW12O40]-4) exhibit a bluish color, being called heteropolyblue. This bluish color disappears in the presence of oxygen. The discoloration time depends on time irradiation of the sample, or on the composition/thickness of the film. It is also possible found photoluminescence in the Phosphotungstates, which is due to the multiples multielectronic collisions.

Biography

D.Sc./B.Sc. **Orlando Elguera** studied Chemical Engineering at the National University of Engineering (Lima-Peru) with Master's studies in Chemistry Sciences at the National University of Engineering (Lima-Peru), and with Doctorate of Science with Major in Analytical and Inorganic Chemistry at the University of São Paulo (Sao Paulo-Brazil). He performed as Analyst of the Laboratory of samples of Geochemical Exploration and Inorganic Compounds at SGS del Peru S.A.C (almost 5 years). He has experience in the following method of analysis: Atomic Absorption Spectrometry, Inductively Coupled Plasma Optical Emission- Mass Spectrometry and X-ray Fluorescence. He has published 11 research articles in journals.

VIRTUAL EVENT

POSTER PRESENTATIONS

OCTOBER 24-25, 2024

Vladimir Yarovenko

Zelinsky Institute of Organic Chemistry Russian Academy of Sciences, Russia

Phototransformations of 3-acyl-2-hetarylchromones with nitroxyl substituents

Abstract:

The development of the chemistry of stable organic radicals has led to the creation of a wide range of functional paramagnetic materials (E.V. Tretyakov et al., Russ. Chem. Rev., 2022, 91, RCR5025; E.V. Tretyakov, in Organic Radicals, Eds. C. Wang, A. Labidi, E. Lichtfouse, Elsevier, 2024, p.61). A separate and important direction in the development of radical chemistry is the targeted design of functional systems that include a paramagnetic group and a fluorophore fragment and are widely used for real-time monitoring of biochemical processes. Previously, we have shown that multilayer optical disks for high-density recording of information can be created on the basis of 3-acyl-2-furylchromones capable of rearrangement into fluorescent products as a result of photoisomerization (V. Barachevsky, M. Krayushkin, V. Kiyko, in Photon-Working Switches, Eds. Ya. Yokoyama, K. Nakatani, Springer Japan KK, Tokyo, 2017, p.181). In the present work methods of synthesis of hybrid products reacting both to UV-irradiation and to magnetic influence were proposed. 2-furyl-3-acylchromones containing paramagnetic groups of different nature were obtained and it was shown that in the process of their UV-irradiation rearrangement with formation of spin-labeled fluorescent products takes place. It seems promising to investigate the photophysical and magnetic properties of spin-labeled chromones, as well as the specific influence of the paramagnetic group on the processes of their photoisomerization with the formation of a multispin system in the excited state.

Biography

Vladimir N. Yarovenko is a leading researcher at the A.E. Chichibabin Laboratory of Heterocyclic Compounds at the Zelinsky Institute of Organic Chemistry of the Russian Academy of Sciences. His research focuses on the design and development of advanced functional materials and advanced drugs. His work is documented in over 240 scientific papers and 30 inventions.

Vladimir Voronov

Irkutsk National Research Technical University, Russia

The NMR study of biologically active metallated alkanol ammoinium ionic liquids

Abstract:

The complexes in which triethanolamine (TEA) acts as a tetradentate ligand are known as atrans-es, tricyclic systems in which the formation of the intramolecular N→M coordination bond forms the basis of their specific properties. Thus, atranses have a special chemistry that allows access to interesting molecular architectures that are of great application importance in various fields, in-cluding medicine and agriculture. The 1H, 13C, 15N, and 111Cd NMR spectra of new biologically active metallated ionic liquids have been obtained in D2O solution reproducing biomimetic condi-tions (1,2). Under these conditions the metallated alkanol ammonium ionic liquids exist as mono-bi- and tricyclic structures, which are in equilibrium. Shift of the equilibrium depends upon nature of a metal and effects all the parameters of the NMR spectra. Peculiarities of ligand exchange, typical for the studied compounds, have been studied in a wide range of temperatures. It is found that the NMR data can be used to control structure of the compounds formed in the course of synthesis. Revealed exchange interactions of TEA complexes suggest that in aqueous solution TEA can be easily replaced by stronger ligand.

Biography

Vladimir Voronov's research interests are related to solving problems of molecular spectroscopy and physico-organic chemistry by methods of nuclear magnetic resonance and quantum chemistry. He is the author of more than three hundred publications in periodicals, including more than thirty books. He received a number of awards established by the Russian Academy of Natural Sciences, including the Gold Medal "For innovative work in the field of higher education". Member of the American Chemical Society.

VIRTUAL EVENT

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Asit Kumar Chakraborty

Vidyasagar University
India

Structural and functional characterization of Cu1 and Nu2 Phyto-Drugs against Multi-Drug resistant bacteria

Abstract:

New drug development against MDR bacteria is a challenging task. So far hundred antibiotic derivatives were destroyed by few dozens mdr genes and few dozens drug efflux genes made the scenario worse making horror of antibiotic void. Plants constantly make ex-metabolites to retard the growth of soil bacteria and thus an ideal source of new antibiotics like alkaloid, saponin, glycoside, flavone, quinone, polyphenol and triterpene. Here, we developed two medicinal plants ethanol extract from Cassia fistula bark and Suregada multiflora root that exceptionally rich in active compounds facilitating easy purification through preparative TLC and UV-shadowing. CU1 from Cassia fistula is a Triterpene-Poly-Bromo-Phenol that inhibits RNA polymerase from E. coli and M. tuberculosis. While NU2 from Suregada multiflora is a poly-Fluro-Phosphate-glycoside that inhibits DNA topoisomerase I of E. coli. We tested the 90% purified phyto-antibiotics in MDR bacteria (E. coli KT-1_mdr, E. coli KC-1_mdr and P. aeruginosa DB-1_mdr) isolated from Ganga River water, rain water, milk, chicken meat and human hair with resistant to ampicillin, amoxicillin, streptomycin, ciprofloxacin, chloramphenicol and erythromycin. The toxicity level of those phyto-drugs was low as tested in mouse 3T3 cells, rats and molly fishes up to 50µg/ml. Although commercial development of those phyto-drugs has not possible yet, we have made MDR-Cure Lotion phyto-extracts in presence of antioxidant and anti-inflammatory principles of 50% ethanol extract of Haldi rhizome and Neem bark to cure human nail infections. The two compounds described here are new and may be an ideal drug combination to cure MDR infections.

Biography

Asit K. Chakraborti obtained the M. Sc. degree in Organic Chemistry from Burdwan University, West Bengal, India in 1977 being placed first in the first class and Ph. D. degree in Synthetic Organic Chemistry from IACS, Kolkata, India in 1985. After post-doctoral research training in USA in the department of Chemistry, Clemson University, South Carolina, during 1985-1987 and in Medicinal Chemistry at Purdue University, Indiana, USA during 1987-1989 he joined the Department of Chemistry, Burdwan University as a faculty and served during 1990-1994. He moved to the department of Medicinal Chemistry of the Institute as Assistant Professor in 1994 and was elevated to Assoc. Professor in 1999 and Professor & Head in 2001. He has guided 38 Ph. D. and 130 Masters students, published 172 research papers (with > 8500 citation with h index of 55), and filed 42 patents. He has delivered 142 lectures in national/international symposium and received several awards and recognition.

Cecil Pace Asciak

University of Toronto
Canada

Novel discoveries in the eicosanoids and other natural products

Abstract:

A simple chemical reaction carried out decades ago in the early stages of the prostaglandin field, that led to an unexpected result initiated my journey into an exciting and productive career in drug discovery that made use of my background in natural products organic chemistry. This result led to my discovery of a new product identified as 6-keto-prostaglandin F1a. A mechanism was proposed suggesting its formation through the first bicyclic intermediate in the prostaglandin field. This intermediate was later chemically synthesised by The Upjohn Co. and called prostacyclin by Vane's group who demonstrated it to be an important unstable highly potent mediator released from the vascular endothelium that inhibited the aggregation of platelets. My subsequent studies in collaboration in part with Yamamoto's group in Japan and Samuelsson's group in Stockholm identified another new pathway involving unstable metabolites of the 12-lipoxygenase pathway named Hepoxilins (HX), a family of C20 hydroxy epoxides which was subsequently shown to be formed by pancreatic islet cells (hence the coined name) and other cell types/tissues although the Hepoxilins were routinely detected as the stable inactive trihydroxy derivatives. To study the biological actions of the native HX, we synthesised their stabilized analogs (PBTs) to study them as prodrugs. The PBTs antagonised HX. The PBTs were shown to possess various biologically positive actions in vitro/in vivo on Calcium translocation on neutrophils, in cancer, on blood coagulation, in inflammation, on diabetes and in ophthalmology. A third research program was embarked in collaboration with J.A Al-Hassan in Kuwait involving lipid products released from catfish skin secretions from the Gulf region demonstrating in vitro actions on cancer, inflammation, and wound healing. (Supported by the MRC, OCRN, CIHR, KFAS). These latter studies supported and extended in vivo and in vitro observations by Al-Hassan's group on the skin secretions and their promising actions in man.

Biography

Cecil Robert Pace Asciak is Emeritus Senior Scientist at the SickKids Research Institute and Emeritus Professor in the Department of Pharmacology and Toxicology at University of Toronto. He is active in research, discovery and commercialization of novel biologically active compounds for development as therapeutics in cancer, inflammation, diabetes, wound healing and pain. He is also a senior member of the Translational Medicine program. He has been involved in lipid research throughout his career, discovering first the changes in prostaglandin synthesis and metabolism LOX derived hepoxilins, and their metabolites and their synthetic analogs.

Michael I. Tribelsky

Lomonosov Moscow State University
Russia

New effects in resonant light scattering by Nano objects

Abstract:

Resonant light scattering by nanoparticles provides a unique opportunity to concentrate a high-amplitude electromagnetic field in a subwavelength area of space as well as to tailor and control its pattern. In addition to purely academic interest, this is extremely important for numerous applications ranging from medicine and biology to telecommunication and data processing. Despite more than a hundred years of extensive study, the problem is still far from completion. A review of new results in this field is presented in this contribution. In many cases, despite the smallness of the scattering particles, their light scattering has very little in common with the conventional Rayleigh case. New, counterintuitive effects, especially those related to violating the quasi-static description of the scattering occurring at the action of (ultra)short laser pulses, are pointed out, inspected, discussed, and classified.

Biography

Tribelsky received his MS from Lomonosov Moscow State University in 1973, a PhD from Moscow Institute of Physics and Technology in 1976, and a Dr. of Sci. (habilitation) from Landau Institute in 1985. He received numerous national and international awards: Leninsky Komsomol Prize (1979); COE Professorship, the University of Tokyo (2006, 2008) and Kyushu University (2007), Japan; Honorary PhD, Yamaguchi University, Japan (2016), etc. Now he heads a laboratory at Lomonosov Moscow State University. Presently, his interest lies in subwavelength optics. He authorizes several books, book chapters, review articles, and more than 100 research papers.

Katerina Lazarova

Bulgarian Academy of Sciences
Bulgaria

Colorimetric thin film humidity Sensors – From material development to Detection

Abstract:

Colorimetric humidity sensors rely on the principles of color change in response to fluctuations in humidity which is often due to the interaction between water molecules and the sensor materials, change of the thickness and/or refractive index and resulting in a shift in the optical properties of the material. These sensors, mostly based on thin films of different materials, usually polymers or inorganic substances, can reversibly change color under varying humidity conditions. Easy detection provided by this method allows using simple visual evaluation of the changes or via spectrophotometry measurements of reflectance/transmittance spectra. In the process of developing such sensors, the main and most important goal is achieving linear dependence on the detected changes with relative humidity RH and exhibiting a short response/recovery time, small hysteresis, good reproducibility and stability. All these properties can be controlled by modifying the materials used, e.g. by synthesis of polymers with different composition and structures or via synthesis of composite materials. Having in mind that the optical response of the sensor is different depending on the characteristics of the thin films and the sensitive materials used, it is important to find the most suitable conditions under which the color change is most significant. The creation of such sensor covers both the selection and modification of the chosen material followed by extensive investigation of sensor`s behavior under changing humidity conditions. Possible applications like optimizing workspaces with real-time environmental monitoring and control of the conditions remotely via IoT, environmental and human body monitoring, etc., are the development trends for futures advancements.

Biography

Katerina Lazarova has been a scientist at the Bulgarian Academy of Sciences for the last 10 years. In 2013 she began her doctorate in the field of photonic crystals and optical sensors based on zeolites and porous materials. In 2016 she became a chief assistant at the IOMT-BAS and from 2019 to 2021 was a postdoctoral fellow with a scholarship in the same field. Currently Dr. Lazarova is Associate professor. Author of more than 40 articles, with awards for presentations in scientific forums and participation in numerous scientific projects in collaboration with other scientific organizations.

Thomas J Webster

Hebei University of Technology
USA

Organic Nano Medicine: Using artificial intelligence to develop improved biomaterials, sensors, and saving the environment

Abstract:

Nanomedicine is the use of nanomaterials to improve disease prevention, detection, and treatment which has resulted in hundreds of FDA approved medical products. While nanomedicine has been around for several decades, new technological advances are pushing its boundaries. For example, Artificial Intelligence (AI) has revolutionized numerous industries to date. However, its use in nanomedicine has remained few and far between. One area that AI has significantly improved nanomedicine is through implantable sensors. This invited talk will present research in which implantable sensors, using AI, can learn from patient's response to implants and predict future outcomes. Such implantable sensors not only incorporate AI, but also communicate to a handheld device, and can reverse AI predicted adverse events. Examples will be given in which AI implantable sensors have been used in orthopedics to inhibit implant infection and promote prolonged bone growth. In vitro and in vivo experiments will be provided that demonstrate how AI can be used towards our advantage in nanomedicine, especially implantable sensors. Lastly, this talk will summarize recent advances in nanomedicine to both help human health and save the environment.

Biography

Thomas J. Webster's (H index: 120; Google Scholar) degrees are in chemical engineering from the University of Pittsburgh (B.S., 1995; USA) and in biomedical engineering from RPI (Ph.D., 2000; USA). He has served as a professor at Purdue (2000-2005), Brown (2005-2012), and Northeastern (2012-2021; serving as Chemical Engineering Department Chair from 2012 - 2019) Universities and has formed over a dozen companies who have numerous FDA approved medical products currently improving human health. He is currently helping those companies and serves as a professor at Hebei University of Technology, Saveetha University, Vellore Institute of Technology, UFPI, and others. Dr. Webster has numerous awards including: 2020, World Top 2% Scientist by Citations (PLOS); 2020, SCOPUS Highly Cited Research (Top 1% Materials Science and Mixed Fields); 2021, Clarivate Top 0.1% Most Influential Researchers (Pharmacology and Toxicology); 2022, Best Materials Science Scientist by Citations (Research.com); and is a fellow of over 8 societies. Prof. Webster is a former President of the U.S. Society For Biomaterials and has over 1,350 publications to his credit with over 53,000 citations. He was recently nominated for the Nobel Prize in Chemistry (2023).

Osman Adiguzel

Firat University
Turkey

Memory characteristics and crystallographic aspects of reversibility in shape memory alloys

Abstract:

Shape memory alloys take place in a class of advanced smart materials by exhibiting dual memory characteristics, thermoelasticity and superelasticity. Thermoelasticity is basically called shape memory effect and initiated with thermomechanical processes on cooling and deformation and performed thermally on heating and cooling, with which shape of material cycle between original and deformed shape in reversible way.

This property is result of successive crystallographic transformations, thermal and stress induced martensitic transformations. Thermal induced martensitic transformation occurs on cooling with cooperative movements of atoms by means of lattice invariant shears in <110 > -type directions on the {110} - type planes of austenite matrix, along with lattice twinning, ordered parent phase structures turn into the twinned martensite structures, and the twinned structures turn into the detwinned structures by means of stress induced martensitic transformation, with stressing material in the martensitic condition. Superelasticity is performed by stressing and releasing material in elasticity limit at a constant temperature in parent phase region, and shape recovery is performed simultaneously upon releasing the applied stress. Superelasticity is also result of stress induced martensitic transformation and ordered parent phase structures turn into detwinned martensite structure with stressing in the parent phase region.

Copper based alloys exhibit this property in metastable β-phase region, which has bcc-based structures at high temperature parent phase field. Lattice invariant shear and twinning is not uniform in copper based ternary alloys and gives rise to the formation of complex layered structures.

In the present contribution, x-ray and electron diffraction studies were carried out on copper based CuAlMn and CuZnAl alloys. X-ray diffraction profiles and electron diffraction patterns exhibit super lattice reflections. X-ray diffractograms taken in a long-time interval show that diffraction angles and intensities of diffraction peaks change with the aging duration at room temperature. This result refers to the rearrangement of atoms in diffusive manner.

It is important that diffraction, scattering, and magnification events are result of photon-matter interaction with laser or other lights in optical level. However, these events occur as photon-matter with x-ray and electron light-matter interactions in quantum level.

Biography

Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He has studied at Surrey University, Guildford, UK, as a post-doctoral research scientist in 1986-1987, and studied were focused on shape memory effect in shape memory alloys. He worked as research assistant, 1975-80, at Dicle University and shifted to Firat University, Elazig, Turkey in 1980. He became professor in 1996, and he has been retired on November 28, 2019, due to the age limit of 67, following academic life of 45 years. He supervised 5 PhD- theses and 3 M. Sc- theses and published over 80 papers in international and national journals; He joined over 120 conferences and symposia in international and national level as participant, invited speaker or keynote speaker with contributions of oral or poster. He served the program chair or conference chair/co-chair in some of these activities. In particular, he joined in last six years (2014 - 2019) over 60 conferences as Keynote Speaker and Conference Co-Chair organized by different companies. Also, he joined over 180 online conferences in the same way in pandemic period of 2020-2023. Dr. Adiguzel served his directorate of Graduate School of Natural and Applied Sciences, Firat University, in 1999-2004. He received a certificate awarded to him and his experimental group in recognition of significant contribution of 2 patterns to the Powder Diffraction File – Release 2000. The ICDD (International Centre for Diffraction Data) also appreciates cooperation of his group and interest in Powder Diffraction File.

Piergiorgio Righetti

Polytechnic University of Milan
Italy

The EVA technology in Analytical Biochemistry

Abstract:

I describe here a modern and unique tool for exploring documents pertaining to the world Cultural Heritage while avoiding their contamination or damage. Known under the acronym EVA, it consists of a plastic foil of Ethylene Vinyl Acetate studded with strong cation and anion resins admixed with C8 and C18 hydrophobic beads. When applied to any surface such foils (cut into diskettes) can harvest any type of surface material, which is then eluted and analyzed via standard means, such as GS/MS (typically for metabolites), MS/MS (for peptide and protein analysis), X-ray (for elemental analysis). We review here a number of past data, such as screening of documents by Bulgakov, Chekov, Casanova, Kepler, as well as by Orwell and Stalin and analysis of the skin of an Egyptian mummy. As a unique example, we quote here the analysis of a book Stalin was reading during World War II (Ivan Grozny): on the pages of this book we found plenty of lithium salts, suggesting that he was bipolar just like Winston Churchill This novel methodology represents a formidable tool for exploring the past life of famous authors, scientist and literates in that it can detect traces of their pathologies and even drug consumption left by saliva and sweat traces on their original hand-written documents. Prior to our invention, the only technique proposed was scraping or grating the surface of the material under investigation, clearly a technique strictly forbidden in museums, private and public collections. In the worst cases, when dealing with pottery or other clay material, chipping away of a piece was proposed, a barbarian way to treat items belonging to the Cultural Heritage.

Biography

On 560 articles reviewed by Mendeley Statistics, Righetti scores 26.680 citations, with an average of 47 citations/article and with a H-index of 81. During the years 2005-2013 he has received 1000 to 1200 citations per year. He has won the CaSSS and the Csaba Horvath Medal awards, on April 15, 2008 at Yale University. In 2011, he has been nominated honorary member of the Spanish proteomics society and in 2012 he has won the Beckman award and gold medal. In 2014 in Madrid, he has been given the HuPO award for proteomic research and, in Atlanta, the American Electrophoresis Society award.

Aaron Sloman

University of Birmingham
UK

How minds with brains evolved from brainless Synapse-Ancestors

Abstract:

I'll argue that biochemical processes in synapses are more important than currently favoured neural mechanisms for deep forms of spatial intelligence that led ancient humans to discover, and use, types of geometric and topological necessity and impossibility, centuries before Pythagoras was born. Complex temples, pyramids and other structures required transporting large blocks of stone across land and water. Much earlier, related forms of spatial intelligence were used in processes of evolution, reproduction and development to construct increasingly complex components of increasingly complex ancient forms of life e.g. hatching processes in eggs of vertebrates and processes of biochemical disassembly and reassembly in insect metamorphosis in cocoons, producing not only new physiologies but also complex new spatial competences, e.g. flying to plants to feed on nectar, and mating (in some cases while flying!) after metamorphosis. There are unobvious connections with physics, chemistry (especially biochemistry), biology, neuroscience, psychology, computation, various branches of philosophy and their histories.

Biography

Aaron Sloman completed a BSc. in mathematics and physics at Cape Town university (1957) then a DPhil in Philosophy of mathematics defending Kant at Oxford (1962). His ideas continued developing at Hull University, Sussex University, then, since 1991, University of of Birmingham (UK). Since officially retired (2012) continued research on the meta-morphogenesis project with most recent results summarised in the abstract for this talk.

VIRTUAL EVENT

ORAL PRESENTATIONS

OCTOBER 24-25, 2024

Naresh Murty Venneti

Wayne State University
USA

New generation Triarylbismuth reagents for Green Cross-Coupling Reactions: Synthesis of biologically active Benzofurans and Tetrasubstituted Functionalized Alkenes

Abstract:

Triarylbismuth organometallic reagents represent a new generation of green, 3-fold coupling agents that have shown great promise in C-C bond formation under palladium-catalyzed conditions. These reagents are particularly atom-economic, capable of transferring all three aryl groups to corresponding electrophilic partners in a single step, which makes them highly efficient and sustainable for synthetic applications. We present the application of triarylbismuths in the synthesis of biologically important 2-arylbenzofuran-based natural products. A key transformation involves a domino cyclization/coupling or coupling/cyclization reaction using substituted 2-(2,2dibromovinyl)phenols in combination with triarylbismuths under Pd-catalyzed conditions. This approach has been successfully applied to the synthesis of 17 biologically relevant benzofuran natural products, demonstrating the method's versatility and efficiency. Additionally, we report the bis-coupling reactivity of 1,1-dibromo esters under Pd-catalyzed conditions using triarylbismuth reagents, further expanding the utility of this reagent class. This established method was utilized in the step-economic convergent synthesis of Quebecol natural product.

Biography

Naresh Murty Venneti earned my Ph.D. in organic synthesis from IIT Kanpur in 2018, where I developed Pd-catalyzed methodologies for C-C bond formations using triarylbismuth reagents. After moving to the USA, I joined Wayne State University as a postdoctoral fellow, specializing in solid-phase peptide synthesis and alkaloid natural products. I advanced to Senior Research Scientist and Lab Manager, leading peptide-based projects like photodesulfurization and on-resin disulfide formation. Since August 2023, I have served as Project Manager on an NIEHS-funded grant, focused on macrocyclic peptides and unnatural amino acid synthesis, while mentoring students and contributing as a peer reviewer.

ACCEPTED PRESENTATIONS

OCTOBER 24-25, 2024

Aigul Malmakova

Bekturov Institute of Chemical Sciences
Kazakhstan

β-Cyclodextrin inclusion complexes of Piperidine-Aromatic amine hybrids in immunotherapy approaches

Abstract:

Compounds that combine the piperidine structure with an aromatic amine group are known as hybrids of piperidine and aromatic amine. Research on these hybrids has been concentrated because of their possible medicinal uses. Piperidine-aromatic amine hybrids' characteristics are essential to their function in drug development, highlighting their significance in medicinal chemistry (1,2). Although many studies indicate the potential role of piperidine-aromatic amine hybrids in immunoregulation, the mechanism of their action and their effective role in various aspects of immune function require additional study. Throughout our study (3,4), series of piperidine-amine hybrids were described, which had high myelostimulating activity with piperazine and morpholine substituents at the nitrogen atoms of the bicyclic piperidine ring. Activity was lost when pyridine was used in place of the morpholine or piperazine ring in bicyclic piperidine. However, after acylation with O-benzoyl chloride N-pyridine substituted 3,7-diazabicyclo[3.3.1]nonane stimulated both erythro- and leukopoiesis while its N-piperazine analog stimulated only leukopoiesis. New compounds have been designed to see how increasing the aromatic rings affected the compounds' immunostimulatory properties. 1-(N-Alkoxyalkyl)-3,5-di(4-fluorobenzalidene)piperidon-4 containing piperidine-phenyl hybrids are obtained by reacting 1-(N-alkoxyalkyl)-4-oxopiperidine with 4-fluorobenzaldehyde in alkaline medium. To a suspension of 1 M of 1-(N-alkoxyalkyl)-3,5-di(4-fluorobenzalidene)piperidone-4 has been added 1 M of phenylhydrazine hydrochloride. All reactions were carried out in methanol. To obtain the inclusion complex of (E)-7-(4-fluorobenzylidene)-3-(4-fluorophenyl)-5-(N-alkoxyalkyl)-2-phenyl-3,3a,4,5,6,7-hexahydro-2H-pyrazolo[4,3-c] pyridine hydrochlorides in ethyl alcohol have been mixed with an equimolar amount of -cyclodextrin dissolved in distilled water. The resulting complex is an amorphous powder, melting above 240°C with decomposition. β-Cyclodextrin complexes hydrochlorides of pyrazolines have been studied for myelostimulating activity. The data were compared with methyluracil indicators. Compound 1 greatly accelerated the division of lymphocyte cells and the relative lymphocyte index reached the value of (93.99±1.9) %, the relative neutrophil and granulocyte-monocyte indices were critically low and amounted to (2.72±0.1) % and (3.44±0.1) % respectively. Administration group likewise had a successful restoration of platelet levels. Compared to the control group's value of 228.5±6.5)•109/L of blood, the total platelet index achieved a value of 548.0±32.41)•109/L of blood. Compound 2 efficiently induced leukocyte

cell growth. The total leukocyte index was 2.11 times higher than the placebo group's blood (3.75±0.7)•109/L and marginally higher than the control group's (7.92±0.5) 109/L blood. The experimental group had a total platelet count of (477.50±21.05) 109/L of blood, which was 2.08 times greater than the control group. Compound 2 stimulated leukopoiesis at the level compared to methyluracil. It was distinguished by a pronounced stimulation of the lymphocyte pool with a pathological critical decrease in granulocytic-monocyte indicators.

Biography

Aigul has completed her PhD at the age of 30 years from Kazakh-British Technical University and postdoctoral studies from Birmingham University. She is the chief researcher of Laboratory of Chemistry of Synthetic and Natural Medicinal Substances, Bekturov Institute of Chemical Sciences. She has published more than 15 papers in reputed journals.

Benmehdi Houcine

University of Bechar
Algeria

Aminopiperidines and derivatives as anti-paf/anti-hiv-1 antagonists. Synthesis and molecular modelling

Abstract:

Excessive levels of PAF and cells of macrophage lineage appear to play an important role in neuronal cell injury, inflammatory syndrome, and HIV replication in CNS resulting in AIDS dementia complex [1-4]. The beneficial effects of PAF receptor antagonists are evident and give rise to expected therapeutic strategies for neurotrauma. We therefore synthesized a novel class of 4-aminopiperidines and ethylenediamine substituted in the position 2 or 3 by groups bearing a carbamate or ureido function. Several substituents were introduced on one or both nitrogens of the 4-aminopiperidine and ethylenediamine rings in order to modify either lipophilicity, electronic distribution or steric effect [5]. Their influence on both anti-PAF and anti-HIV-1 activities was also investigated. Our findings revealed that the most compounds were found to be able to diminish both HIV-1 replication in monocyte-derived macrophages and PAF induced platelet aggregation. Moreover, a molecular modelling analysis has been triggered to calculate 3D electrostatic potential maps of selected compounds and to study the conformational space of the nitrogen-containing derivatives.

Biography

Benmehdi Houcine is a teacher in chemistry at TAHRI Mohamed University of Bechar since 2001, holder a doctorate degree in applied organic chemistry from Abou Bakr Belkaid University of Tlemcen, and a seconde doctorate degree in chemistry interfaces, physics, computer science with biology from Paris VII University in 2009. My field of research focused on phytochemistry, organic chemistry and environmental sciences.

Holtomo Olivier

University of Maroua
Cameroon

Prediction of pKa calculation of methyl prolithospermate in aqueous solution using cluster continuum model

Abstract:

The methylprolithospermate (MPL) molecule is a biological which was recently synthesized from salvia yunnanensis CH Wright by Yu et al [1]. It contains antioxidant activity, anti-inflammatory activity, antimicrobial activity, antidiabetic activity, anticancer activity, antiplatelet activity, etc [2,3]. Three thermodynamic cycles were required for the estimation of MPL's pKa by the means of DFT at the level of B3LYP/6-311++G(d,p)//6-31+G(d). The sites of interest are the functional groups -OH and -COOH, located at four sites in MPL. In these thermodynamic cycles, water molecules were held as monomers in one hand (monomer cycles), and cluster on the other hand (cluster cycles). The isodesmic scheme was used as benchmark method and yielded pKa1 = 5.0 ± 0.5, pKa2 = 7.3 ± 01, pKa3 = 8.7 ± 0.1, and pKa4 = 14.6. The findings show that monomer cycles produce very good results for the three cycles at carboxylic site (pKa1) depending on the size of water molecule. Cluster cycles are excellent in one case of thermodynamic cycle.

Biography

Olivier Holtomo has completed his PhD at the age of 34 years from Douala University in Cameroon. He has been working in computational chemistry and physical chemistry. He is Lecturer in the Department of Physics and Head of Service of Cooperation at the University of Maroua. He has published 16 papers in reputed journals.

Jai Kumar

Kurukshetra University
India

Non-Template engineered Co(II), Ni(II) and Cu(II) containing macrocyclic complexes: In-vitro and in-silico studies

Abstract:

Using a non-template approach, a series of divalent Co, Ni, and Cu containing macrocyclic complexes was synthesized. In this method, the condensation reaction of dimedone and triethylenetetramine occurs in the absence of metal ions, resulting in the formation of macrocyclic moiety. This moiety reacts with transition metal ions and forms the macrocyclic complex. The ligand and it's all complexes were characterized by using various physicochemical and spectroscopic techniques such as Mass, IR, EPR, PXRD, electronic, molar conductance, elemental analysis and thermal studies. These studies suggested that the complexes of Co and Ni have octahedral geometry, while the Cu contained complexes exhibited distorted octahedral geometry around the metal ion. The DFT study was used to evaluate the various quantum parameters for analyzing the stability orders of ligand and complexes in a solid state. Furthermore, the antioxidant and antimicrobial activities of ligand and its complexes were screened. Their results revealed that all complexes have remarkable biological potential. Additionally, the docking study was also used to support the results of antimicrobial activity by find out the binding energy between complex and proteins. The ADMET method was also used to study the drug-likeness behavior of these newly synthesized complexes.

Biography

Jai Kumar earned his PhD from Kurukshetra University at the age of 32. He has 13 publications in reputable peer-reviewed journals. He has also attended numerous national and international conferences in India to enhance his research knowledge and interact with professionals from other research domains. He qualified for UGC-NET JRF with an All-India Rank of 89. Currently, he is working as an Part-time Assistant Professor in Department of Chemistry at Kurukshetra University, Kurukshetra.

Kajal

Kurukshetra University
India

Exploring the potential of reduced graphene oxide-Copper Sulfide (CuS/RGO) nanocomposite for energy storage applications

Abstract:

3D hierarchical porous copper sulfide (CuS) flower-dispersed Reduced graphene oxide (RGO) composites with high energy density and good stability were created using an efficient one-step solvothermal process in effort to create exceptional performance electrochemical supercapacitors (ECs). Precise tuning improved regulated defects and porosity, resulting in increased electrode surface area and specific capacitance. At 4 A/g current density, the optimized CuS/RGO electrode showed a specific capacitance of 2560 F/g. Moreover, after 6000 cycles, the electrode retained 92.8% of its capacitance at 30 A/g, demonstrating exceptional endurance. We designed an asymmetric supercapacitor using CuS/RGO as the cathode and activated carbon (AC) as the anode to show off its usefulness. This configuration's energy and power density were indicated as 32 Wh/kg and 3.3 kW/kg, respectively, demonstrating its efficiency and adaptability. Therefore, our promising electrochemical results suggest that the hydrothermally produced hierarchical CuS/RGO composite electrode is a promising material for energy storage applications.

Biography

Kajal is in her 4th year of PhD from Kurukshetra University. She has 5 publications in reputable peer-reviewed journals. She has also attended numerous national and international conferences in India to enhance his research knowledge and interact with professionals from other research domains. She qualified for CSIR UGC-NET JRF with an All-India Rank of 62.

Constantin Simovski

Aalto University School of Electrical Engineering
Finland

Suppression of Diffraction in Microsphere-Assisted Nanoscopy

Abstract:

When the microsphere-assisted subwavelength imaging was revealed the experts in nanoscopy split onto two camps. One camp suggested the explanation in terms of geometrical optics (GO), claiming that the microsphere forms a magnified virtual object. Another camp claimed that this is impossible due to diffraction and suggested the alternative theory of near-to-far field transform (NFFT) in which the sphere converts the spatial spectrum of the object near field into an angular spectrum of the far field. Recent numerical studies seemingly overturned both GO and NFFT theories. However, the shortage of these studies was ignorance of the normal (to the sphere) polarization of the object. In my group, we found that the GO team was right because the imaging beam created by a normally oriented point dipole located near the sphere surface is paraxial and the diffraction is suppressed in it. Radiation along the dipole axis is exactly zero and this zero prohibits the diffraction which nothing but energy transport along the wave front. Our papers were met negatively because the normal polarization of the object was considered by both camps as a minor effect noticeable only far from the touchpoint sphere-substrate. However, I will show accurate simulations proving that the nearfield coupling between the dipole and the microsphere is destructive for the tangential polarization and constructive for the normal one. As a result, the normal polarization of the object dominates even at small distances from the touchpoint and even for the normal illumination of the object through the substrate. will describe the main design principles implemented in the developed active solutions.

Biography

Constantin Simovski has defended his PhD in 1986 in Leningrad Polytechnic University (USSR). In 2000 he defended the Habilitation thesis in St Petersburg Polytechnic University (Russia). Since 2008 he has been with Helsinki University of Technology (Finland). Now he is a full professor at Aalto University. He has published more than 250 papers in reputed journals. Total amount of scientific publication exceeds 420.

Ephraim Mathew

Adam Mickiewicz University
Poland

Plasmonic anoisotropy of ordered subwavelength metal nanostructures deposited on corrugated sapphire templates

Abstract:

Structural modulations in metal surface reorders the collective oscillation of surface charges, resulting in the excitation of different types of plasmon resonance modes, as in a roughened metal surface the EM near field is focused on its rough tips due to the localization of surface plasmon resonance in its sharp lateral cross-sections. Substrates decorated with metal nanoparticles of different size, shape and arrangements exhibit tuneable (LSPR)localized surface plasmon resonance modes[1] and are most commonly used in surface enhanced spectroscopies. Non-percolated metal films with semi-continuous networks exhibit unique plasmonic properties with enhanced scattering cross-section. Percolation theory and its recent experimental studies of optical, electrical and morphological properties provided evidence of both localized and de-localized plasmon modes coexisting in near-percolated metal films[2]. In this poster we discuss the plasmonic properties of non-percolated Au films deposited by electron beam evaporation in ultrahigh vacuum conditions onto corrugated transparent sapphire dielectric[3]. This causes the nucleation of Au clusters to self-assemble based on the template topography as ordered, anisotropic subwavelength metal arrays. Analysis revealed an unique property of the sample which transmits or scatters light based on the excitation polarization. The LSPR scattering further exhibited a dichroic property dependent on the excitation polarization. We studied the topographical and optical properties of these samples and specifically analyse its dependence on light attributes such as polarization and wavelength. These substrates with tuneable (LSPR) throughout the visible –NIR region are highly beneficial in various applications such as meta-surfaces, optical filters, SERS sensing and on-chip communications.

Ganggang Dong

Xidian University
China

Radar Target Recognition in Small-Sample Scenarios via Scene Re-Imaging

Abstract:

Target recognition via deep learning has achieved great performances in the preceding works. Yet this family of method are dependent on large amounts of training data with label information. For radar sensors, it is diffcult to collect labeled data in practical due to the absent imaging truth. The commonly used solution is data augmentation. However, seldom studies are devoted to complex-valued radar images. In this presentation, radar target recognition via scene reimaging is proposed. The original image is first cast into the frequency-aspect domain. The one axis represents the transmitted frequency, while the other presents the synthetic azimuth. The inverse operations of zero-padding and windowing are then applied on the transformed data. Two kinds of imaging techniques, the intra-sample reimaging and the intersample reimaging are presented to generate new radar images. The generated images are finally used to improve the learning effectiveness of deep models. Multiple comparative studies are performed to demonstrate the advantages of the proposed method.

Biography

Ganggang Dong received the M.S. and Ph.D. degrees in information and communication engineering from the National University of Defense Technology, Changsha, China, in 2012 and 2016, respectively. He is currently an Associate Professor with Xidian University, Xi'an, China. He has authored more than 50 scientific papers in peer-reviewed journals and conferences, including the IEEE TIP, TGRS, TIM, TCYB, and Pattern Recognition. His research interests include, but not limited to deep learning, synthetic aperture radar imaging, radar target detection and recognition, cognitive radio, and radar image interpretation. Dr. Dong received more than 1410 citations in Google Scholar. He received the 2017 Excellent Doctoral Thesis of the Chinese Institute of Electronics.

Gulmina Malik

Polytechnic of Turin
Italy

Independent Dynamic Bandwidth Allocation algorithms' co-existing in Virtual Passive Optical Networks and their progression to Coherent PON

Abstract:

With the rise in internet traffic, 5G applications, and high bandwidth services, network operators are more inclined to come up with innovative solutions for the provision of services and network access. In our research we have implemented the merging engine which exhibits the co-existence of the virtual Dynamic Bandwidth Allocation (DBA) algorithm at Optical Line Terminal (OLT), sharing the Passive Optical Network (PON) upstream capacity. Virtualization is achieved by permitting the network operators full control over capacity assignment algorithms. This work has been evaluated with extensive simulations on NS-3 XGPON module. Our work presented maximization of the Bandwidth utilization by sharing the upstream frame between multiple operators. This sharing increases economic sustainability by allowing several operators to operate over the same deployed fiber and generate a customized frame-level allocation, giving them complete control over their upstream traffic scheduling. Coherent PON (CPON) is another solution to improve the optimal performance and bandwidth management in the access networks. We have proposed a PON tomography model that uses Digital Signal Processing (DSP) techniques to collect the real time data from the Optical Line Terminal (OLT) and Optical Network Units (ONUs). This data is used to analyze the chromatic dispersion and other nonlinearities in both physical and logical layers. This data is then trained to provide an automatic bandwidth allocation. As an outcome to this framework of CPON and Virtual PON, network performance, scalability, efficiency and bandwidth utilization of the existing network has improved and it can pave the way for future next-generation

Biography

Gulmina Malik is currently doing her PhD in Electrical Engineering (Department of Electronics and Telecommunication) from Politecnico di Torino, Turin, Italy. She completed her Master's in Electrical Engineering from National University of Sciences and Technology (NUST) Pakistan. She has published one conference paper in the Asia Conference of Photonics and is currently working as a researcher in the Politecnico di Torino, Turin, Italy in collaboration with Infinera, a telecommunication industry.

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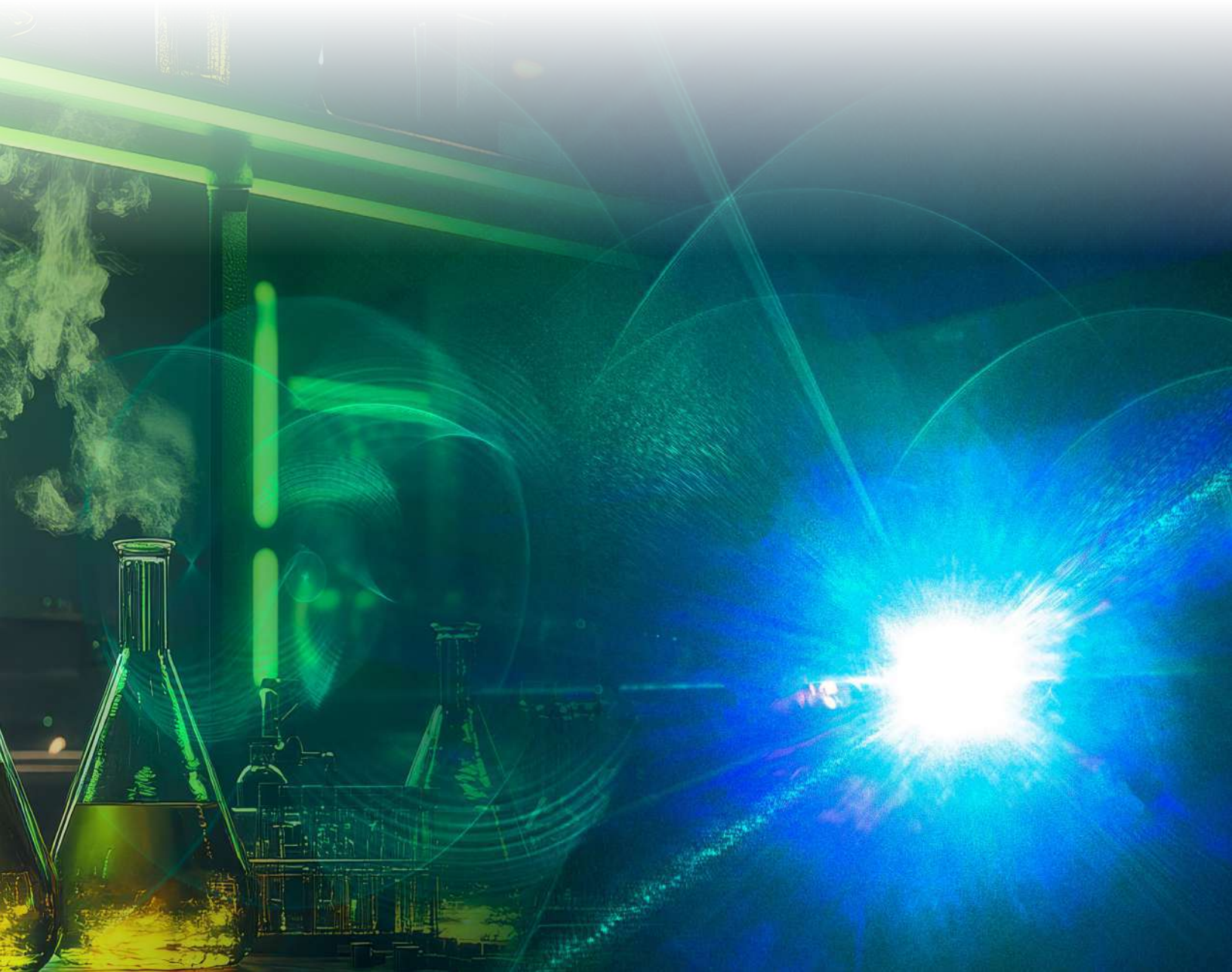

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