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World Congress on

CHROMATOGRAPHY AND SEPARATION SCIENCE

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International Conference and Exhibition on

SATELLITE AND SPACE MISSIONS

November 12-13, 2018 | Rome, Italy

DAY 1

Keynote Forum

John M Quinn
Exos Aerospace, USA

Biography

John M Quinn started his career as a member of the US Navy's Silent Service. Having traversed the depths of the ocean, developed control engineering skills and built a few engineering companies, he shifted his focus to a quest for space. To achieve this endeavor, John joined his friend and mentor David Mitchell (most commonly known as a 4th Generation Texas Oil man, founder of TRADE way and Pastor) to cofound and lead Exos through the development of reusable rockets. John is passionate about the space and believes the next breakthrough in Industry, biotech and education will be found in the microgravity of space. Exos is nearing completion of their reusable SARGE suborbital launcher that is the technological basis for their orbital launcher technologies. By proving their technologies on a reusable suborbital vehicle, Exos can mitigate risk of entry as they the race to provide reusable orbital capability to the micro and nanosat markets.

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SARGE SRLV PATHFINDER MISSION REVIEW

Statement of the Problem: Exos believes it's far to hard to get research payloads to space and we've made it our quest to do something about it. Utilizing our SPACEedu… program we can help educators put payloads in space in as little as 60 days (and that's because the regulations have not caught up with our capabilities yet and that's how long it takes for payload reviews in the US). Next our SPACEaid… program will allow us to conduct hundreds of biomedical research experiments (per flight) aboard our reusable launch vehicles that are built to be turned around and flown again within a few days of recovery. And finally our third area of focus is SPACEbuild… where we envision companies using the microgravity and vacuum environment of space to manufacture goods that simply cannot be manufactured or compounds that can't be blended in the earth's atmosphere. Exos is excited to share our flight experience with you at the Satellite and Space and Conference and open your eyes to the possibilities frequent suborbital and small orbital launches can enable.

Fig.1. The Pathfinder launch of the Exos SARGE SRLV on August 25th 2018

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Claudia Barile, J Chem Tech App 2018, Volume 2

Claudia Barile
Politecnico di Bari, Italy

Biography

Claudia Barile is a Lecturer of Department of Mechanics, Mathematics and Management at the Politecnico di Bari since April 2017. She achieved the Master's Degree in Mechanical Engineering, Magna cum laude in July 2008 at the Politecnico di Bari. She got the PhD title on February 2012 in Advanced Production Systems at the Politecnico di Bari. Her research activities are mainly focused on the mechanical characterization of materials (composites, metals, polymers, etc.) with both traditional and innovative experimental techniques. She has published 19 papers in scientific impacted journals, 1 book chapter, and 2 books. She has 23 indexed conference papers. The h-index of the author is 9 with a total of 195 citations. She has also published 6 papers in a no-indexed journal. She took part in many international and national conferences as relator.

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MECHANICAL CHARACTERIZATION OF CARBON FIBER REINFORCED PLASTICS SPECIMENS FOR AEROSPACE APPLICATIONS

In the last years Composites Fibres Reinforced Plastics materials are increasing their use in structural applications for aerospace industry. The aim of ensuring high performances is based on a deep knowledge of the mechanical response of the composite components in different workloads. Components are exposed to severe environmental conditions characteristic of flight settings, as elevated temperatures close to engines and/or cold temperatures. The typical assembly of composites consists of multiple layers stacked together in a specified sequence. Layers could be arranged with different orientations, different sequences and different technological procedure for supplying precise mechanical properties that need to be studied. The introduction of new peculiarities, able to improve mechanical properties of composites, is also investigated. It refers to an unconventional fibres' disposition combined with the through-the-thickness stitching on the in-plane mechanical properties of composites. Conventional carbon fibres arrangement is commonly referred to a Cartesian coordinate system. Fibres are positioning in bundles along different angle orientations respect to the zero lamina. The use of a polar coordinate system of continue carbon tow is now introduced to create specimens as well as complex geometry components simply. This approach aims to introduce several benefits in the material's manufacturing strategy and if compared with the conventional process seems to be very promising by reducing delamination phenomena.

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Bettina M Mrusek, J Chem Tech App 2018, Volume 2

Bettina M Mrusek

Embry Riddle Aeronautical University, USA

Biography

Bettina Mrusek received her PhD Degree in Business administration from Northcentral University in 2016. She has done MBA from Park University and is currently pursuing a Master of Science in Aeronautics, specializing in Space studies and unmanned system from Embry Riddle Aeronautical University. She is currently an assistant professor for the College of Aeronautics, Embry Riddle Aeronautical University. Her research interests include aircraft maintenance, human factors, management, and unmanned systems.

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Note:

SATELLITE MAINTENANCE AND REPAIR: A CRITICAL COMPONENT IN MINIMIZING FINANCIAL RISKS AND REDUCING SPACE DEBRIS

While there are thousands of satellites orbiting the Earth's atmosphere, many are not in use due to unforeseen or unavoidable conditions. Despite the intense testing of these systems prior to launch, the unforgiving environment of space disrupts the operation of these satellites, rendering them inoperable. This presents a significant financial loss, while also contributing to space debris. The projected number of satellites scheduled to enter into low Earth orbit is expected to rise substantially over the next decade. Therefore, the associated financial losses due to inoperable satellites will likely rise as well, as will the potential of space debris colliding with other satellites or crashing back to Earth. Although rendered inoperable, many of the individual components are still valuable, which presents another opportunity for wasted resources if the satellites cannot be retrieved. Advances in unmanned technology, however, may provide an opportunity to repair these satellites. Leveraging robotics, avionics, and autonomous operations with unmanned spacecraft platforms may allow for the development of a spacecraft that can repair the satellite in orbit. However, the specific requirements needed to launch an unmanned spacecraft into low Earth orbit with repair and maintenance capabilities must be first be identified. In this exploratory paper, the author will employ a qualitative research approach in the form of a literature review and corresponding comparative analysis to gain insight into the feasibility of an unmanned robotic spacecraft that can autonomously repair inoperable satellites. Financial and feasibility elements will be reviewed to determine the most efficient and practical platforms that can be developed and used as potential prototypes for the identified mission.

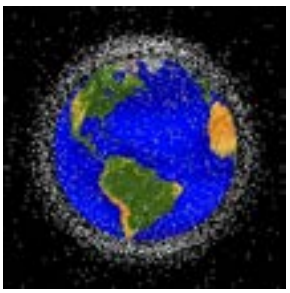

Fig.1. National Aeronautics & Space Administration (NASA) image of objects in low Earth orbit. Approximately 90% of the objects are not functional satellites (NASA, 2018).

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Necati MENEK, J Chem Tech App 2018, Volume 2

Necati MENEK

Ondokuz Mayıs University, Turkey

Biography

Necati Menek has completed his BSc in Chemistry-Physics Department from Ondokuz Mayıs University in 1986 and Master degree in chemistry from Institute of Science Ondokuz Mayıs University in 1988. He has completed his PhD degree in physical chemistry area at the same university. He was an assistant professor in 1996, association professor in 1998 and professor doctor in 2004 at Ondokuz Mayıs University. He has been working on physical chemistry and electro chemistry area. He had been a visiting-professor at McGill University (Montreal, Canada) and Nis University (Nis, Serbia). His research interests are electro chemistry, voltammetry, electro chemical reaction mechanism, chemical degradation, molecular spectroscopy. He is currently a manager of Kavak Vocational College at Samsun University and as an academic staff at Department of chemistry science and art faculty in Ondokuz Mayis University.

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Note:

INVESTIGATION OF ELECTROCHEMICAL REACTION MECHANISM OF SOME AZO DYES BY USING VOLTAMMETRIC TECHNIQUES

Azo compounds all have the same functional group -N=N-, which is a chromophore. So many kinds of them are common dyes for food, pharmaceuticals beverages and textile industry as coloring agents, biomedical studies, advanced application in organic synthesis and high technology areas as laser, liquid crystaline displays, electro-optical devices and ink-jet printers. But they also represent a human hazard because their degradation products including amines are carcinogenic. Thus, it appears necessary to identify and quantify with accuracy the dyes present demonstrate the need for developing fast, accurate and selective techniques for synthetic dyes analysis[1-4]. Modern polarographic and voltammetric methods are particularly suitable for these purposes because of their high sensitivity, their applicability over an unusually wide concentration range, and their low investment and running costs. There are a large number of articles published that are discussing various aspects of azo compound reduction and the interest in this topic is continuing. The aim of the majority of the investigations are studying different aspects of the electrode processes or finding suitable compounds and conditions for analytical applications involving azo compounds. The polarographic and voltammetric experiments were carried out using a computer controlled electroanalysis system is Metrohm 757 VA Computrace Electrochemical Analyser. A three electrode combination system was used. This consisted of a Multi Mode Electrode (DME, SMDE and HMDE), a Ag/AgCl reference electrode and a Pt wire auxiliary electrode. Azo compounds with reducible or oxidizable moieties are electrochemically active. These substances yield faradaic current as a result of redox process and they can be determined by direct polarographic and voltammetric methods. Electroinactive azo compounds can be determined in the same way after derivatization. The detailed elucidation of the reduction mechanism of the azo compounds in a variety of experimental condition can be explained by using different voltammetric and polarographic techniques. Electrochemical and physicochemical properties of azo, heterocyclic azo, their derivatives and their metal complexes have been explained by different voltammetric and polarographic techniques.

Tonetti C, J Chem Tech App 2018, Volume 2

Tonetti C
CNR-ISMAC, Italy

Biography

Tonetti C worked as researcher at CNR-ISMAC of Biella (National Research Council–Institute for Macromolecular Studies). Main research activities regards the development of innovative methods (like UPLC/ESI-MS) for animal hair fibers identification in textile products, the production of keratin nanofiber membranes and chitosan composite materials for air and water depuration and the study of new finishing processes (like antimicrobial finishing, nanoparticles). She worked also on projects regarding the eco-toxicological qualities of textile products.

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LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY APPLIED TO THE IDENTIFICATION AND QUANTIFICATION OF ANIMAL HAIR FIBERS IN TEXTILE PRODUCTS

In this work, liquid chromatography coupled with electrospray mass spectrometry (LC/ESI-MS) was applied to the identification and quantification of animal hair fibers in textile products. International producers of textiles in cashmere and other specialty fibers requires suitable analytical methods for the assessment of fiber composition to protect consumers and defend themselves from common frauds, especially when cheaper fibers like wool and yak are blended with expensive fibers like cashmere. The animal fibers identification by traditional microscopic methods is often subjective, depending largely on the expertise of operator. In this case, the greatest difficulty is to distinguish and quantify yak from cashmere fibers because their external morphology is very similar. LC/ESI-MS analysis was successfully used to discriminate wool, cashmere and yak in textile materials by a proteomic approach. Keratin extracted from animal fibers was digested by trypsin, and the proteolytic peptides were analyzed by LC/ESI-MS to identify peptide markers, specifically and univocally, linked to the species of origin of the fibers. Several suitable peptide markers were identified and validated by many analyses of, known and unknown, wool/cashmere/yak blends at various stages of manufacture (fibers, slivers, yarns, fabrics, and raw materials) and with different treatments (dyed, depigmented, bleached, finished forms), showing 100% specificity and 100% selectivity. Some peptides were also used for the quantification of the different species in mixed fibers by LC/ESI-MS. Validation experiments and blind tests confirmed their ability to act as very specific qualitative and quantitative markers. Limit of detection (LOD) was estimated to be 3% and the precision of the analysis was always very good. Finally, it was demonstrated that bleaching, dyeing and depigmentation did not affect significantly the qualitative and quantitative analysis. The proteomic method based on LC/ESI-MS has become an international standard named “ISO 20418-1 Textiles - Qualitative and quantitative proteomic analysis of some animal hair fibres Part 1: Peptide detection using LC-ESI-MS with protein reduction”.

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Keynote Forum

Satyajit Patra, J Chem Tech App 2018, Volume 2

Satyajit Patra
American International Medical University
USA

Biography

Satyajit Patra is the Chairperson of Research and PhD program at American International and Medical University located at St. Lucia. He completed M. Pharm in medicinal chemistry and PhD in Cancer molecular biology from Manipal University. He obtained postdoctoral training in cancer genetics from University of California San Diego, USA. He has several peer reviewed publications that have been cited over 200 times in different fields including cancer, 3D bioprinitng, isolation of natural biomolecules.

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APPLICATION OF ADVANCED CHROMATOGRAPHY IN DISCOVERY OF ANTICANCER DRUGS

Identification and quantification active biomolecules and metabolites including secondary metabolites in a biological system is an integral part of the system biology Metabolomics. Chromatography provides a platform to analyze the difference between metabolic unperturbed and perturbed networks, one prominent example of use of chromatography in analyzing differences in cancerous and non-cancerous samples. This offer detailed information of fundamentals of the disease pathology, disease prognosis and diagnosis. Many researcher are focusing on identifying and analyzing metabolomics and its extension of these information in the study of differential cancer cells, identification of novel drug molecules and biomarkers, however limited approaches have been explored towards focusing a specific cancer cells or disease. The answer to the long lasting questions of identification of suitable technology for exploring these questions could be offered by Metabolomics to analyze biomarkers, useful for identification and prediction of predisposition to cancer and early stage diagnosis. In the field of cancer therapy this is very promising and a important clinical need to eliminate severe pathological effect of cancer. We will discuss use of metabolomics as a tool for analyzing biomarker and discovery of novel drug molecule in cancer, and the principal focus will be on the use of this tool to envisage resistance and sensitivity of anticancer drug, and early diagnosis, prognosis, and metastasis of cancer.

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Lokesh Kumar Gupta, J Chem Tech App 2018, Volume 2

Lokesh Kumar Gupta
TEVA API, India

Biography

Lokesh Kumar Gupta has completed his PhD at the age of 25 by researching in University of Delhi and Ch. CS University Meerut, India. He is an analytical research scientist and serving as Chief Manager of Analytical R&D team with TEVA API (a world leader in generic pharmaceuticals) in India, focusing on analytical research/methods development, spectroscopic characterization of organic pharmaceuticals, technology validation, impurity isolation & characterization etc. He also works for ensuring the laboratory compliance across all sites of TAPI, around the globe. He is participating and discussing his commended research in several national/international seminars/conferences. He had published more than 42 papers in peer reviewed reputed journals of chemistry & spectroscopy and serving as an eminent referee for several journals of international repute.

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Note:

MODERNIZATION IN LIQUID CHROMATOGRAPHY: MANUAL TO GREEN SEPARATIONS

From decades chromatography has been accepted as a key analytical tool for understanding and characterization of molecules in chemistry, the level of world-wide research activity in this field promises that these capabilities will continue to improve, rapidly. Over the period of time sensitivity of chromatography tools have been improved to work at micro level and in more depth, ultimately become a faster research tool; such tools now being used as process analytical tools (PAT) giving online understanding of characteristics of a molecule during research/development and in production. Same time their utilization has widen up by coupling these tools with mass spectrometry and NMR etc e.g. (LC-MS-MS, LC-NMR ...etc.) Primary Liquid chromatography was defined in the early 1900s by the work of the Russian botanist, Mikhail S. Tswett. Today, liquid chromatography, in its various forms, has become one of the most powerful tools in analytical chemistry. The acronym HPLC, was coined in 1970, it was equipped with a pump (~35 bar). The early 1970s saw a tremendous leap in technology with wearing pressure >400 bar and incorporated improved injectors, detectors, and columns. HPLC really began to take hold in the mid-to late-1970s. With continued advances in performance during this time the acronym HPLC remained the same, but the name was changed to high performance liquid chromatography (HPLC). HPLC is now one of the most powerful tools in analytical chemistry. It has the ability to separate, identify, and quantitate the compounds that are present in any sample it can be dissolved in a liquid. Today, compounds in trace concentrations as low as parts per trillion (ppt) may easily be identified. HPLC now has become the backbone for the analysis of pharmaceuticals, food, nutraceuticals, cosmetics, environmental matrices, forensic samples & industrial chemicals. In the starting of 21st century, further advancement in HPLC came out in terms of UPLC (Ultra Performance.....) (>1000 bar), faster separation with improved resolution & speed. This technology represented a candid revolution and leadership with excitement and new courage in analytical science with confidence and reliable/reproducible results. One step ahead towards green chemistry, primary concern for elimination or major reduction in the use of organic solvents in chromatography opened the doors to another technology: Supercritical CO2 extraction, where major part of the mobile phase is CO2 (non-toxic, non-flammable and physiologically compatible). Compared to other techniques, use of SFE/SFC, the compounds are cleaner, efficiency is higher, selectivity is better, yield is higher and costs are lower apart from being the Green Technology, it is leading separation/purification technology. In this review, I had evaluated and focused on advancement and updates in LC field, with respect to technology update & applications.