

5th International Conference on **Materials Science & Nanotechnology**

FUTURE MATERIALS 2024

October 21-23, 2024 | Athens, Greece

October 24-25, 2024 | Online, Zoom

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 **NOVOTEL ATHENES**
4-6 Michail Voda, 104 39 Athens, Greece

 <https://materialsconference.yuktan.com/>



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<https://us06web.zoom.us/j/89460930346?pwd=E24fhBQe77BNgZ4o0L4DOq45YCnIn.1>

Meeting ID: **894 6093 0346**

Passcode: **246069**

08:00 On-site Registrations

08:45 Introduction and Opening Remarks

Moderator: **Ester Vazquez**, University of Castilla-La Mancha, Spain

Keynote Session (30+5 Mins)

09:00 Strategies for Regeneration of Hard Tissues

Jonathan Knowles, University College London, United Kingdom

09:35 Health Impacts Assessment of Graphene Related Materials a Prerequisite for a Safe and Sustainable Biomedical Use

Peter Wick, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

10:10 Coffee Break

@ Foyer

Symposium I: Future Biomaterials-Biomedical, Medicine and Other Applications (I)

Session 1: Biomaterials for Cancer Treatments

Chair: **Cristina Martín Jiménez**, UC3M & UCLM, Spain

10:40 Tumor Eradication by Boron Neutron Capture Therapy Using 10-boron Enriched Nanoparticles

Naoki Komatsu, Kyoto University, Japan

11:00 Investigating the Complexation Propensity of Self-assembling Dipeptides with the Anticancer Peptide-drug Bortezomib: A Computational Study

Rissanou Anastassia, National Hellenic Research Foundation, Greece

11:20 Assessment of Minimal Residual Disease in Acute Myeloid Leukemia Using Microfluidics, Nanosensors, Next Generation Sequencing and Artificial Intelligence Algorithms

Lorena Dieguez, International Iberian Nanotechnology Laboratory, Portugal

11:40 Pt-based Nanostructured Coordination Polymers for Glioblastoma Treatment. The Resurgence of Platinum Drugs

Fernando Novio, Autonomous University of Barcelona (UAB), Spain

12:00 Exploring the Impact of Nanoparticle Stealth Coatings in Cancer Models: From PEGylation to Cell Membrane Coating Nanotechnology

Paola Sánchez Moreno, University of Granada, Spain

12:20 Iridium(III) Complexes as Potential Photosensitizers for Photodynamic Therapy

Wenfang Sun, The University of Alabama, United States

12:40 Group Photo followed by Lunch Break

Session 2: Engineering Biomaterials

Chair: To be updated

13:40 3D Bioprinting of Functional Nano-bioinks Enable Longitudinal, Noninvasive Tracking of Scaffolds

Vahid Serpooshan, Georgia Institute of Technology & Emory University, United States

- 14:00 **Graphene-based Hydrogels as Advanced Antibacterial Therapy**
Cristina Martín Jiménez, University Carlos III of Madrid & University of Castilla-La Mancha, Spain
- 14:20 **Biomedical Applications of Amorphous Calcium Carbonate Nanoparticles**
Susana Carregal Romero, CIC biomaGUNE, Spain
- 14:40 **Development of Warping-free Polypropylene-based Elastomer Filament for 3D Printing of Medical Prosthesis**
Abdulhakim Almajid, Prince Sultan University, Saudi Arabia
- 15:00 **Advanced Magnetic Nanomaterials at the Frontier of the Wireless Neuromodulation**
Danijela Gregurec, Friedrich Alexander University, Germany

Session 3: NanoSafety

Chair:

- 15:20 **Neural Nanotechnology: Advancing Safe Applications of Nanomaterials within the Central Nervous System**
Mattia Bramini, University of Granada, Spain
- 15:40 **Advanced Graphene Biomaterials for Cardiovascular and Antimicrobial Applications**
Inês C. Gonçalves, i3S/INEB, Portugal
-
- 16:00 **Coffee Break** @ Foyer
-
- 16:20 **New Approach Methodologies (NAMs) Based on *In vitro* Ecotoxicity Models to Support the Development of Safe and Sustainable by Design (SSbD) Advanced Materials**
Alberto Katsumiti, GAIKER Technology Centre, Spain
- 16:40 **Sources of Biases in the *In Vitro* Testing of Nanomaterials: The Role of Biomolecular Corona**
Andrea Armirotti, Italian Institute of Technology, Italy
- 17:00 **Hazard Characterization of Hexagonal Boron Nitride at the Skin Level**
Marco Pelin, University of Trieste, Italy
- 17:40 **Poster Presentation and Networking Drinks** @Foyer

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<https://us06web.zoom.us/j/82018518727?pwd=QBf84JSYfYcfTo7CUtg80vDtHMmbm.1>

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Passcode: **010220**

Symposium II: Materials for Electronics, Optics and Photonics

Chair: Gabriel A. Lopez, University of the Basque Country, Spain

Session 1: Advances in Optoelectronics

- 13:40 **Perovskite Photodetectors**
Liang Li, Soochow University, China
- 14:00 **Photonic Metasurfaces Enhanced with 2D Materials for Nonlinear Applications and Optoelectronics**
Odysseas Tsilipakos, National Hellenic Research Foundation, Greece
- 14:20 **Tin Halide Perovskites for Photonics and Optoelectronics**
Juan P. Martínez-Pastor, University of Valencia, Spain
- 14:40 **Fabricating Air-stable Copper Films with Exceptional Electrical Conductivity without Conventional Sintering**
Jessica Pereira, University of Southampton, United Kingdom

Session 2: Detection Frontiers

Chair:

- 15:00 **Synthetic Methodologies for the Preparation of Plasmonic Nanoparticles with Chiral Morphology at the Single-particle Level**
Jesus Mosquera Mosquera, University of A Coruña, Spain
- 15:20 **Exploring Anisotropic Ultra-high Frequency Thermal and Electromagnetic Properties of Structured Carbon Metastructures with Thermoelastic Optical Indicator Microscope**
Arsen Babajanyan, Yerevan State University, Armenia
- 15:40 **Towards High-performance Photoactivated Organic Materials for Spin-based Quantum Sensors**
Max Attwood, Imperial College London, United Kingdom

16:00 **Coffee Break** @ Foyer

- 16:20 **Design Rules for Structural Colors in All-dielectric Metasurfaces: From Individual Resonators to Collective Resonances and Color Multiplexing**
Thomas Wood, INSA Lyon, ECL, CNRS, University Claude Bernard Lyon 1, France
- 16:40 **Assessment of Surface Preparation Methods for Mercury (Hg) Probe Schottky Capacitance-Voltage (MCV) on Epitaxial Silicon**
Cristina Sanna, GlobalWafers Co. Ltd, Italy

Session 3: Heterostructures in Electronics

- 17:00 **Switching of Perpendicular Magnetization by Magnon Torque in All Oxide Heterostructures**
Xixiang Zhang, King Abdullah University of Science & Technology, Saudi Arabia
- 17:20 **Manipulation of the Polarization of THz Waves by Woven Metal Mesh Structures**
Tigran Abrahamyan, Yerevan State University, Armenia

List of Poster Presentations

Judges: [Ester Vazquez](#), University of Castilla-La Mancha, Spain
[Gabriel A. Lopez](#), University of the Basque Country, Spain

- FMN-1 **Ideal Metal Organic Frameworks' (MOFs)-platforms for the Development of Multifunctional MOF-Nanocarbon Hybrids**
[Giasemi Angeli](#), National Hellenic Research Foundation, Greece
- FMN-2 **A New Dual Emitting System Resulting from the Encapsulation of Rhodamine B Molecules within MOF-808 Cavities**
[Gianpiero Buscarino](#), University of Palermo, Italy
- FMN-3 **Preparation of High-entropy Sulfides for Energy Conversion and Storage**
[Elena Miliutina](#), University of Chemistry and Technology Prague, Czech Republic
- FMN-4 **Automated Characterization of Metal Organic Polyhedra**
[Andrea Oyarzún-Aravena](#), University of Cambridge, United Kingdom & University of Magallanes, Chile
- FMN-5 **On the Potential of Spatial Abstractions to Enhance Chemical Descriptions**
[Andrea Oyarzún-Aravena](#), University of Cambridge, United Kingdom & University of Magallanes, Chile
- FMN-6 ***In situ* Electrosynthesis of MOF-type Nanomaterials of Zn-BTC, Cu-BTC and Zn/Cu-BTC on ITO Electrode for the Study of the Hydrogen Evolution Reaction**
[Carmen Castro Castillo](#), University of Chile, Chile
- FMN-7 **Synthesis and Characterization of Cobalt Nanoparticles for Enhanced Oxygen Evolution Reaction in Alkaline Environments**
[Borislava Mladenova](#), Institute of Electrochemistry and Energy Systems, BAS, Bulgaria
- FMN-8 **Investigating the Effect of pH on the Growth of Coprecipitated Ni(OH)₂ Agglomerates as Precursors of Cathode Materials for Li-ion Batteries**
[Jong-Tae Son](#), Korea National University of Transportation, South Korea
- FMN-9 **Inner/Outer Side Chain Engineering of Non-fullerene Acceptors for Efficient Large-area Organic Solar Modules Based on Non-halogenated Solution Processing in Air**
[Sabeen Zahra](#), University of Science and Technology, South Korea
- FMN-10 **ZnS-Ag in Form of Janus Nanoparticles and Multi-headed Structures for Hydrogen Evolution in Visible Light**
[Hanna Głowienke](#), University of Gdansk, Poland
- FMN-11 **Edge-sharing Octahedrally Coordinated Ni-Fe Dual Active Sites on ZnFe₂O₄ for Photoelectrochemical Water Oxidation**
[Zhiyong Jiang](#), University of Science and Technology of China, China
- FMN-12 **New Organic Cathodes based on Polyperylenediimides and Graphene-type Structures for Ca-multivalent Secondary Batteries**
[Belén Martínez Moral](#), University of Jaén, Spain
- FMN-13 **A Study on the Processing and Microstructure of High Strength Ti Alloy with Solute Element by Metal 3D Printing**
[Choon-Man Lee](#), Changwon National University, South Korea
- FMN-14 **On the High Photodarkening Values of Some Amorphous Thin Films of the Ge-As-S System**
[Petr Kutálek](#), University of Pardubice, Czech Republic
- FMN-15 **Effect of Incorporation of Nickel/Cobalt Ions on the Structure and Physical Properties of Zinc-Phosphate Glasses**
[Jana Holubová](#), University of Pardubice, Czech Republic

- FMN-16 **Advanced SiOC 3D Microstructures: Fabrication via Laser Lithography and Pyrolysis**
Greta Merkininkaitė, Center for Physical Sciences and Technology, Lithuania
- FMN-17 **Detecting Drugs on the Air an SERS and Artificial Neural Network**
Vasilii Burtsev, University of Chemistry and Technology Prague, Czech Republic
- FMN-18 **Detection of Microplastics in Water Using SERS and Machine Learning**
Karolina Kukralova, University of Chemistry and Technology Prague, Czech Republic
- FMN-19 **Low-temperature Reactions and Interface Formation Between Ga and Electrode Materials Used in Microelectronic System**
Yoonchul Sohn, Chosun University, South Korea
- FMN-20 **Integrating Flexible Optical Waveguides into Soft Robotics: Advancing Multimodal Sensing for Enhanced Control and Operational Precision**
Xiang Zhang, Defense Innovation Institute, Academy of Military Science, China
- FMN-21 **Characterizing Scaled Integrated Quantum Photonic Devices Based on Machine Learning Approaches**
Teng Yi, Defense Innovation Institute, Academy of Military Science, China
- FMN-22 **Plasmonic Anisotropy of Ordered Subwavelength Metal Nanostructures Deposited on Corrugated Sapphire Templates**
Ephraim Mathew, Adam Mickiewicz University, Poland
- FMN-23 **Novel Synthetic Bio-architectures Configured with S-layer Technology**
Andreas Breitwieser, BOKU, Austria
- FMN-24 **Boosting the Acetone Gas Sensing of WS₂-ZnO Nanosheets by Codecoration of Pt/Pd Nanoparticles**
Jae-Hun Kim, Inha University, South Korea
- FMN-25 **Adaptation of the Electronic Properties of Bi₂O₂Se Through Surface Modification and Magnetic Doping**
Jose Mejia, Pontifical Catholic University of Chile, Chile
- FMN-26 **Superheating Nature of REBCO Nanofilms and their Applications in the Growth of REBCO Superconductors**
Xin Yao, Shanghai Jiao Tong University, China
- FMN-27 **Plasmon-produced Solvated Electrons: A New Approach with Utilization of Hybrid Structures**
Vera Shilenko, University of Chemistry and Technology Prague, Czech Republic
- FMN-28 **High-fluence Nitrogen Ion Implantation into Titanium and its Effects on Surface Saturation**
Vojtěch Smola, Czech Technical University in Prague, Czech Republic
- FMN-29 **A Novel N-doped Porous Carbon/g-C₃N₄ Composite for Enhanced Photocatalytic Reduction of CO₂**
Roopesh Mekkat, University of Chemistry and Technology Prague, Czech Republic
- FMN-30 **Regrowth-free InGaN/GaN Super Lattice Capped GaN CMOS and Ring Oscillator with InGaN Back Barrier**
Mahalaxmi, Indian Institute of Technology Bombay, India
- FMN-31 **Efficient Microfluidic-based Synthesis of Polymer Brushes**
Markéta Vrabcová, Charles University, Czech Republic
- FMN-32 **Peptide/Graphene Nanocomposites: An in Silico Investigation**
Elena Markopoulou, University of Crete, Greece
- FMN-33 **Factor Analysis of ssNMR Spectroscopy Data of Alginate-pectin Based Systems Crosslinked by Ca²⁺ vs. Zn²⁺ vs. Cu²⁺**
Martina Urbanova, Institute of Macromolecular Chemistry, CAS, Czech Republic

- FMN-34 **Architecture of Multicomponent Polycrystalline Materials at Atomic Resolution**
Jiri Brus, Institute of Macromolecular Chemistry, CAS, Czech Republic
- FMN-35 **Self-assembled Capsid: Synthesis and Characterization**
Anca Aldea, CIFRA, Romania
- FMN-36 **Optical and Morphological Characterization of Gold Nanoparticles Synthesized Using Tannic Acid**
Jinga Maria-Lorena, CIFRA, Romania
- FMN-37 **A Small-diameter Vascular Graft Promotes Rapid and Benign Remodeling of the Neointima Through Dual Release of Nitric Oxide and Hydrogen Sulfide**
Fubang Liang, Shanghai Jiao Tong University, China

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8:45 Introduction and Day 2 Opening Remarks

Moderator: Ester Vazquez, University of Castilla-La Mancha, Spain

Keynote Session (30+5 Mins)

9:00 **3D Interconnected Carbon Nanostructures for Filter Capacitor Applications**

Bingqing (B.Q.) Wei, University of Delaware, United States

9:35 **Additive Manufacturing of Carbon Based Materials**

Philippe Poulin, Paul Pascal Research Center (CRPP) - CNRS, France

10:10 **Coffee Break**

@ Foyer

Symposium I: Future Biomaterials-Biomedical, Medicine and Other Applications (II)

Session 4: Innovations in Sensing and Recognition

Chair:

10:30 **Towards Discovering Aggregation Inhibitors Against Light Chain Amyloidosis**

Z. Faidon Brotzakis, Institute for Bioinnovation, BSRC Alexander Fleming, Greece

10:50 **PCR-free Sensing of Pathogen Nucleic Acid for Biomedical Applications**

Emanuele Luigi Sciuto, University of Messina, Italy

11:10 **Novel Materials for an Emotion Recognition System Embedded in Fashion Items**

Antonio Maffucci, University of Cassino and Southern Lazio, Italy

11:30 **Chemically Programmable Bacterial Probes for the Recognition of Cell Surface Proteins**

Leila Motiei, Weizmann Institute of Science, Israel

11:50 **Insights into Molecular Details of Lipid-based Drug Delivery Systems from Liposomes to Lipid Nanoparticles**

Mahmoud Moradi, University of Arkansas, United States

12:10 **Wicking Prediction in Lateral Flow Assays: Establishing a Data-driven Structure-wicking Relationship for Porous Membranes**

Willfried Kunz, Karlsruhe University of Applied Sciences, Germany

12:50 **Lunch Break**

Young Researchers Presentations (10+5 Mins)

13:50 **Dissolvable Multistage Drug Release Microneedles for Skin Biofilm Treatment: Light Activate Killing, Anti-inflammation, and Healing**

Haihan Chen, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

14:05 **Reactive Molecular Dynamics Simulations to Investigate Drug Delivery by Functionalized Nanoparticle**

Cheherazade Trouki, CNR-IPCF & University of Pisa, Italy

14:20 **Improving Serotonin Detection: The Power of Molecular Imprinted Polymers**

Adrián Martínez Abelairas, University of A Coruña, Spain

- 14:35 **Development of Decellularized Magnet-driven Stem Cell Carriers for Cartilage Regeneration Therapy**
Hanjin Huang, City University of Hong Kong, Hong Kong
- 14:50 **Enhancing Lateral Flow Assay Sensitivity Through Computational Modeling**
Farshid Jamshidi, Karlsruhe University of Applied Sciences, Germany
- 15:05 **Blood Plasma Protein Interactions with Low-fouling Zwitterionic Polymer Brushes**
Monika Spasovová, Charles University, Czech Republic
- 15:20 **Functionalization of Recycled Cellulose-based Film with Ionic Liquids and Anti-bacterial Agents for Biomedical Applications**
Chaima El Kouali, Hassan II University of Casablanca, Morocco

15:35 **Session Break**

Symposium III: Future Materials for Energy, Environment and Sustainability (I)

Young Researchers Presentations (10+5 Mins)

- 15:40 **Coarse-grained Ferritic Fe-10Al-4Cr-4Y₂O₃ Nanocomposite as a Top Material for the Green Energetics**
Denisa Bártková, Institute of Physics of Materials CAS, Czech Republic
- 15:55 **Effect of Cationic Impurities in Recycled Active Materials for Lithium-ion Batteries**
Elie Fayad, Chimie Paristech, PSL Research University, CNRS, IRCP, France
- 16:10 **Composite Organic Ionic Plastic Crystal Membranes: The Effect of Etherfunctionalized Cations on Light-gas Separation Performance**
Muhammad Shaharyar, Deakin University, Australia
- 16:25 **Exploration and Development of Repairable Sulfur-based Polymer Composites**
Y. Athulya Wickramasingha, Deakin University, Australia

17:00 **VISIT followed by Informal Dinner (19:00) (Ticket Required)**

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Symposium IV: Nanotechnology and Nanomaterials

Session 1: Synthesis and Manufacture I

Chair:

- 10:30 **Pulsed Laser Ablation Synthesis of Nanoparticles in Spectral Methods**
Karel Novotný, Masaryk University, Czech Republic
- 10:50 **Roll-to-roll Dry Transfer of Large-scale Chemical Vapor Deposition Graphene**
Wei Li, The University of Texas at Austin, United States
- 11:10 **Tunable Covalent Micropatterning of Graphene by Emulsions**
Marina Garrido, IMDEA Nanociencia, Spain
- 11:30 **Synthesis of Butterfly-like Shaped Gold Nanomaterial: Toward the Regulation of Liquid-Liquid Phase Separated Droplets as a Small Reaction Field**
Tomohiro Nobeyama, Tsukuba University, Japan
- 11:50 **Mechanochemical Approach for the Fabrication of Carbon Based (nano)composites: From Environmental Remediation to Piezoresistive Devices**
Antonio Turco, Institute of Nanotechnology National Research Council, Italy
- 12:10 **Multifunctional PEO Coatings**
Pawel Gluchowski, Graphene Energy Ltd., Poland
- 12:30 **Opening the Bandgap of Graphene**
Bin Chen, Shanghai Advanced Research in Physical Sciences, China

12:50 **Lunch Break**

Session 2: Synthesis and Manufacture II

Chair:

- 13:50 **Scaling Up Excellence: Advanced Exfoliation Techniques for Industrial Nanomaterial Production**
Antonio Esau Del Rio Castillo, BeDimensional S.p.A., Italy
- 14:10 **Vanadium-sulfide Layers Prepared with Atomic Layer Deposition**
Zsofia Baji, HUN-REN Centre for Energy Research, Hungary
- 14:30 **Influence of Sintering Modes During Hot Pressing of Partially Stabilized ZrO₂ Nano Powders on Reproducibility of Mechanical Properties**
Edvin Hevorkian, University of Life Sciences in Lublin, Poland
- 14:50 **Generation of Paper Substrates Modified with Metallic Nanoparticles and Potential Applications in Remediation and Packaging**
Nataly Roxana Silva González, University of Desarrollo, Chile
- 15:10 **Cobalt-Nitrogen Bonding for Triggering Low-power Dual Detection of NO₂ and NH₃ by Mixed Valence Co²⁺ and Co³⁺**
Mokhotjwa Simon Dhlamini, University of South Africa, South Africa

15:30 **Advanced Self-cleaning Paints: Sustainable Solutions with PNC-Doped TiO₂ Nanoparticles**
Qaisar Maqbool, Vienna University of Technology, Austria

Young Researchers Presentations (10+5 Mins)

15:50 **UV Sensors Based on Vertically Aligned Carbon Nanotubes (VA-CNTs)**
Ravi Prakash Yadav, Sapienza University of Rome, Italy

16:05 **Iron Oxide Nanoparticles Modified with Cannabinoids and Anti-cancer Drugs**
Jan Taudul, University of Warsaw, Poland

16:20 **Si Nanowire-based Schottky Sensors for Selective Sensing of NH₃ and HCl via Impedance Spectroscopy**
Valerii Kondratev, Alferov University, Russia

16:35 **Deuterium Interaction with Carbon Nanotube Surfaces: Atomic-scale Insights and Hydrogen Storage Implications**
Sammar Tayyab, Sapienza University Rome, Italy

17:00 **VISIT followed by Informal Dinner (19:00) (Ticket Required)**

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8:45 Introduction and Day 3 Opening Remarks

Moderator: Ester Vazquez, University of Castilla-La Mancha, Spain

Keynote Talk (30+5 Mins)

9:00 **Macromolecular Hybrid Materials and Nanostructures Based on Polysaccharides**

Stergios Pispas, National Hellenic Research Foundation, Greece

Symposium IV: Nanotechnology and Nanomaterials (II)

Session 3: Nanomaterials for Bioapplications

Chair: Cristina Martín Jiménez, UC3M & UCLM, Spain

9:35 **Biosensing with Graphene Transistors: Advantages and Challenges**

Pedro Alpuim, International Iberian Nanotechnology Laboratory, Portugal

9:55 **Essential Role of Chemistry in Shaping Graphene FETs for Biosensing**

Alejandro Criado, University of A Coruña, Spain

10:15 **2D Carbon Nanomaterials as Photoactive Antiviral and Antibacterial Agent**

Giacomo Reina, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

10:35 **Describing the Mechanism of Interaction in the PAMAM Dendrimer and Doxorubicin Conjugated System by Ab Initio Calculations**

Ernesto Osvaldo Wrasse, Technological Federal University of Paraná, Brazil

10:55 **Coffee Break**

@ Foyer

Symposium III: Future Materials for Energy, Environment and Sustainability (II)

Session 1: Materials for Environmental Sustainability

Chair:

11:15 **Nanoplastics Retention and Transport in Filtration Systems**

Serge Stoll, University of Geneva, Switzerland

11:35 **Selenium Nanoparticle Impacts on Microorganisms: Effect of Coating, Dissolution and Aggregation**

Wei Liu, University of Geneva, Switzerland

11:55 **Utilizing Reticular Chemistry: Designing Functional Materials for Environmental Solutions**

Giasemi K. Angeli, National Hellenic Research Foundation, Greece

12:15 **Nanocarbons for Sustainability Solutions and CO₂ Capture**

Wala Algozeeb, Saudi Aramco, Saudi Arabia

12:35 **Awards Distribution followed by Lunch Break**

Session 2: Energy Production

Chair:

- 13:30 **Selective Absorber Coatings for Solar-thermal Energy Conversion**
Juan Carlos Sánchez-López, The Institute of Materials Science (CSIC-US), Spain
- 13:50 **Solid Polymer Electrolytes Based on Nitrogen Groups as a New Generation of Electrolytes for Ca-multivalent Secondary Batteries**
Antonio Peñas Sanjuán, University of Jaén, Spain
- 14:10 **Towards Tailored Radiative Properties for High-temperature Materials via Multi-scale Geometry Engineering**
Charles-Alexis Asselineau, ANU-SoE, Australia & UPM-ETSII, Spain
- 14:30 **Design of Electrode Materials for Na-S Batteries**
Yan Yu, University of Science and Technology of China, China
- 14:50 **Electrochemical Hydrogen Pump/compressor - Gas Diffusion Electrodes, Membrane Electrode Assembly and Possibility for Two Stage Compression**
Galin Borisov, Institute of Electrochemistry and Energy Systems, BAS, Bulgaria
- 15:10 **What are the Challenges and Opportunities of $ZnFe_2O_4$ Photoanodes for PEC Water Splitting Applications?**
Xiaodi Zhu, University of Science and Technology of China, China

Session 3: Energy Harvesting

Chair:

- 15:30 **Advanced Materials for Near Ambient Temperature Energy Harvesting**
Oscar J. Dura, University of Castilla-La Mancha, Spain
- 15:50 **CO₂ Capture for Energy Harvesting: Atomistic Modelling of the Working Mechanism**
Federico Raffone, Polytechnic University of Turin, Italy
- 16:10 **Electrocatalytic Nitrate to Ammonia**
Shuyan Gao, Henan Normal University, China
-
- 16:30 **In-Person Closing Remarks**
-

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09:40 AV Check

09:50 Introduction and Day 4 Opening Remarks

Keynote Session (30+5 Mins)

10:00 **Anisotropic Nano-MOFs**

Chengzhong (Michael) Yu, University of Queensland, Australia

10:35 **Nanoscale Carbon Materials for Emerging Battery Electrodes and Their In Situ Characterization**

Jang-Kyo Kim, Khalifa University, UAE & University of New South Wales, Australia

Online Symposium I: Materials for Electronics, Optics and Photonics

11:10 **Ultra-high Efficiency of SOT-MRAMs Using MTJs with Strain-induced Magnetic Anisotropy**

Hiroaki Yoda, Yoda-s, Inc., Japan

11:30 **Triboelectric Sensors for a Comprehensive Normal-shear Stress Perception**

Songtao Hu, Shanghai Jiao Tong University, China

11:50 **Long-range Supramolecular Assembly of a Pyrene-derivatized Polythiophene/MWCNTs Hybrid for Resilient Flexible Electrochromic Displays**

Laura Maggini, University of Vienna, Austria

12:10 **Measurement of Emissivity with a New IR Thermal Sensor Dubbed TMOS and a New Approach**

Yael Nemirovsky, Technion and TODOS Technologies, Israel

12:30 **YRP: Impedance Characteristics of Polycrystalline ZnGa₂O₄ Thin Films Under Solar Blind UV Irradiation**

Reiya Kase, Tokyo Denki University, Japan

12:45 **YRP: Fiber-integrated Non-volatile Optical Modulator Based on Ge₂Sb²Te₅**

Xiang Li, Harbin Engineering University, China

13:00 **E-Poster: High Temperature Superconductivity - Exciton Mechanism**

Junhui Cao, Westlake University, China

13:10 **E-Poster: Enhancing Emission of Perovskite Films Using Soft Lithography**

Mathias Bizimana, African Leadership College, Mauritius

13:20 **Controllable Circular Polarization Lasing via Chiral Metamaterials**

Maria Kafesaki, FORTH & University of Crete, Greece

13:40 **Integration of Polyoxometalates into Redox-based Memory Applications: Challenges and Progress**

Kirill Monakhov, Leibniz Institute of Surface Engineering, Germany

14:00 **Experimental and Theoretical Study of Spontaneous Light Emission Enhancement in ZnO Nanowires Gratings**

Emmanuel Centeno, University of Clermont Auvergne, France

14:20 **Nanodevices Based on Carbon Nanotubes**

Taher Ghomian, University of Maine, United States

Session I

- 14:40 **Metal-organic Frameworks in Hydrogen Technologies: Proton Exchange Membrane Fuel Cells and Green Hydrogen Generation**
Sergio Carrasco, IMDEA Energy, Spain
- 15:00 **Electrification Phenomena on Biological Surfaces and Potential Uses**
Fabian Meder, Italian Institute of Technology, Italy
- 15:20 **Transforming Waste into Sustainable Construction Materials: Durable Geopolymers from Recycled Sources**
Ileana Ielo, University of Messina, Italy
- 15:40 **Keynote Talk: Recent Progress in the Development of Materials for Reversible Solid Oxide Cells**
Meilin Liu, Georgia Institute of Technology, United States
- 16:15 **Discovering Ion-electron Interactions at V_2O_5 /LiPON Electrochemical Interfaces Using Depth-resolved Cathodoluminescence Spectroscopy**
Leonard Brillson, The Ohio State University, United States
- 16:40 **Solid-state Lithium Batteries: Market Trends and Innovations**
Chad Lindner, American Elements, United States
- 17:00 **Scanning Electrochemical Microscopy for Characterizing Electrode/electrolyte Interfacial Processes of Lithium-ion Batteries**
Rong He, National Renewable Energy Laboratory, United States

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10:20 AV Check

10:40 Introduction and Day 5 Opening Remarks

Online Symposium II: Future Materials for Energy, Environment and Sustainability

Session II

10:50 **Recent Developments in Narrow Energy Gap Photoactive Absorbers for Wavelength-selective Transparent Photovoltaic Devices**

Terence Wong, Nanyang Technological University, Singapore

11:10 **Giant Piezoelectricity in Nanoporous (Ba,Ca)(Ti,Zr)O₃**

Yukana Terasawa, Kumamoto University, Japan

11:30 **Stable Photoelectrochemical Oxidation Followed by Li⁺-deintercalation at Solid/solid Interfaces Toward Solar Energy and Conversion**

Kenta Watanabe, Tokyo Institute of Technology, Japan

11:50 **Integrating Numerical Assessment and Experimental Disassembly for Sustainable Evaluation of Bonded CFRP Structures: A Life Cycle Analysis Approach**

Janko Kreikemeier, German Aerospace Center, Germany

12:10 **Ligno-cellulosic Fiber Mediated Columnar-structure in Matrix Composite**

S  verine A.E. BOYER, CNRS MINES Paris PSL, France

12:30 **Dissecting the Core-shell Interface Effect on the Thermal Stability of Microencapsulated Phase Change Materials for Efficient Thermal Energy Storage Application**

Melbert Jeem, Hokkaido University, Japan

Online Symposium III: Nanotechnology and Nanomaterials

12:50 **Keynote Talk: Nanozeolites with Controlled Defect Sites and Structural Flexibility: Future Materials for Selective Gas Separation and Biomedicine**

Svetlana Mintova, CNRS, ENSICAEN, Normandy University-Caen, France

13:25 **New Tricks for Old Drugs: Utilisation of Novel Drug Delivery Systems to Overcome Cisplatinresistant Malignant Pleural Mesothelioma**

Amalia Ruiz Estrada, University of Bradford, United Kingdom

13:45 **Morphological Effects in Metal Oxide Nanostructures: A Statistical Analysis of Ethanol Sensors Based on SnO₂**

Andrea Ponzoni, CNR-INO, Italy

14:05 **Innovative Pyroelectric Implantable Sensors for Cardiovascular Complications Real-time Monitorization**

Mariana Rocha, IFIMUP/FCUP, Portugal

14:25 **Design of MOF/Gelatin Hydrogel Composites Mediated by Coacervation Process for the Capture of Volatile Organic Compounds**

Nathalie Steunou, ILV- UVSQ, University of Paris-Saclay, France

14:45 **Laser Patterned Polymer Graphene Composites for the Production of Sustainable Devices**

Alessandra Scida, National Research Council of Italy, Italy

15:05 **Enhance the Thermal Conductivity of Phase Change Materials PCM Using Nanocomposites**

Maha Alotaibi, King Abdulaziz City for Science and Technology, Saudi Arabia

E-Poster Presentations (7+3 Mins)

- E-FMN-1 **High-order Harmonic Generation in the Giant Fullerene Molecules**
Armenuhi Ghazaryan, Yerevan State University, Armenia
- E-FMN-2 **Rheological Behavior of Polymer Materials Filled by Microwave-modified Bentonite**
Zuzana Micicova, Alexander Dubček University of Trenčín, Slovak Republic
- E-FMN-3 **Modified Wood Flour and its Effect in Polymer Matrix**
Slavomira Bozekova, Alexander Dubček University of Trenčín, Slovak Republic
- E-FMN-4 **The Effect of Temperature on the Parameters of the Mixing Process in the Preparation of Elastomeric Composites**
Ivan Labaj, Alexander Dubček University of Trenčín, Slovak Republic
- E-FMN-5 **Design of a Sustainable System Based on Paper-Cyclodextrin Nanosponges-Copper Nanoparticles for the Remediation and Detection of Organic Pollutants**
Sebastián Salazar Sandoval, University of Desarrollo, Chile
- E-FMN-6 **Potential Occupational Exposures to Nanoparticles by Aircraft Mechanics at A Flight Training Facility**
Cynthia T. Pugh, Embry-Riddle Aeronautical University, United States

Online Symposium IV: Future Biomaterials-Biomedical, Medicine and Other Applications

- 16:25 **Hybrid Inorganic-organic Materials for 4D Printed Dynamic *In vitro* Models**
Dorleta Jimenez de Aberasturi, CIC biomaGUNE, Spain
- 16:45 **Combinatory Use of Cell Secretome and Biodegradable Biomaterials for CNS Regenerative Medicine: Insights on Spinal Cord Injury and Parkinson's Disease**
António Salgado, University of Minho, Portugal
- 17:05 **Assembly of Double-Hydrophilic Block Copolymers Triggered by Metal Ions: Applications in Catalysis and Biology**
Jean-Daniel Marty, University of Toulouse, France
- 17:15 **Significance of Soft Tissue Viscoelasticity in Energy Dissipation by Tissues**
Frederick Silver, Robert Wood Johnson Medical School, United States
- 17:35 **Utilization of Nanomaterials for Realization of Unconventional Wearables-wearables**
Shideh Kabiri Ameri, Queen's University, Canada
- 17:55 **Water-soluble Dendritic Antioxidants**
Choon Lee, Central Michigan University, United States
- 18:15 **YRP: Hydrolytically Degradable and Biocompatible Highly-entangled Hydrogels**
Alex Sunday, Harvard University, United States
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- 18:30 **Virtual Closing Remarks**
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We wish to see you again @
FUTURE MATERIALS-2025

Organising Partner

GED Biomedical Innovations AB

Per Albin Hanssons vag 41

Malmö- 20512, Sweden

Phone: +46 40 666 53 35

Administrative Office

Yuktan Technologies Pte Ltd

20 Cecil Street, #05-03, Plus

Singapore 049705

Phone: +65 9189 1271

Email: committee@materialeurope.com

Web: <https://materialsconference.yuktan.com/>