ICM 2022

The 4th International Conference on Materials: Advanced and Emerging Materials

19–21 October 2022 | Barcelona, Spain

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#ICM2022BCN

4th International Conference on Materials: Advanced and Emerging Materials

MGS Auditorium
Barcelona, Spain
19 – 21 October 2022

Conference Chairs
Prof. Dr. Maryam Tabrizian
Prof. Dr. Filippo Berto

Organised by

Conference Secretariat
Elena González
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4th International Conference on Materials: Advanced and Emerging Materials

19 – 21 October 2022, Barcelona, Spain

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Morning	**Coffee Break**	**Coffee Break**	**Coffee Break**
Morning	*S2. Nanotechnology in Material Sciences and Engineering - Part I*	*S3. Materials Processing and Manufacturing*	*S2. Nanotechnology in Material Sciences and Engineering - Part II*
Afternoon	**Lunch**	**Lunch**	**Closing Remarks & Awards Ceremony**
Afternoon	*S6. Optical, Electrical and Magnetic Materials*	*S1. Materials Characterization - Part II*	
Afternoon	**Coffee Break & Poster Session A**	**Coffee Break & Poster Session B**	

Wednesday 19 October 2022: 08:15 - 13:05 / 14:35 - 17:40

Thursday 20 October 2022: 09:00 - 13:05 / 14:35 - 17:50 / **Conference Dinner: 20:00**

Friday 21 October 2022: 09:00 - 13:15

Conference Programme

Wednesday 19 Oct 2022

08:15	Registration Desk Open (Check-in)
08:45 – 09:00	Welcome from the Chairs
09:00 – 09:45	**Plenary Talk : Kazunori Kataoka** - Engineered nanosystems and nanoconjugates with smart functionalities for targeted therapy of intractable diseases
	Chair: **Maryam Tabrizian**

Session 1. Part I
Materials Characterization
Session Chairs: **Tomasz Garbowski** and **Emil Babić**

09:45 – 10:00	**Emil Babić** - Are compositionally complex alloys intrinsically better than conventional ones?
10:00 – 10:15	**Damian Mrówczyński** - The role of imperfections in numerical homogenization of multi-layered panels with a corrugated core
10:15 – 10:30	**Natalia Staszak** - Numerical homogenization of three-layer plates with a soft core
10:30 – 10:45	**Lukmanul Hakim Zaini** - Nanofibrils from oil palm trunk: Effect of delignification and fibrillation technique
10:45 – 11:00	**Ewa Olewnik-Kruszkowska** - The role of surfactants in the formation of homogenous polymeric films based on polylactide and cellulose acetate propionate
11:00 – 11:30	**Coffee Break**

Session 2. Part I
Nanotechnology in Material Sciences and Engineering
Session Chairs: **Tohid Didar** and **Danatbek Murzalinov**

11:30 – 11:50	**Keynote Talk : Tohid Didar** - Micro and nano engineered bio-interfaces for diagnostics, therapeutics and public health
11:50 – 12:05	**Ateeque Siddique** - Chemotherapy-Eluting Nanoparticle Acrylic Bone Cement for Local Adjuvant Treatment of Spinal Metastases

12:05 – 12:20	**Shadmad Khan** - Patterning Pathogen-responsive DNAzymes onto Food Packaging for Real-time Food Monitoring in situ
12:20 – 12:35	**Chongchong Tang** - Phase formation and thermal stability of quaternary MAX phase thin films in the Cr-V-C-Al system: an experimental combinatorial study
12:35 – 12:50	**Danatbek Murzalinov** - Formation of light-emitting particles with different parameters by coating ZnO on a silicon surface with several porosity levels
12:50 – 13:05	**Alessandro Corozzi** - Bioinspired Hydrophobic Coatings for Antifouling Application
13:05 – 14:35	**Lunch**

Session 6
Optical, Electrical and Magnetic Materials
Session Chairs: **Federico Bella** and **Kristen Dellinger**

14:35 – 15:05	**Invited Talk : Federico Bella** - Advanced Materials Supporting the Lithium and post-Lithium Energy Technologies
15:05 – 15:20	**Agnieszka Pawłowska** - A new type of an Organic Memristive Device based on interactions between polymer thin-films
15:20 – 15:40	**Keynote Talk : Kristen Dellinger** - Next-generation substrates for surface-enhanced Raman spectroscopy
15:40 – 15:55	**Anamika Kumari** - A scheme to determine the carrier density distribution, potential profile, and subband quantization of a conducting interface LaVO3/SrTiO3
15:55 – 17:25	**Coffee Break and Poster Session A**

Thursday 20 Oct 2022

09:00 – 09:45 **Plenary Talk : Molly Shoichet** - Emulating the Environment : Soft Materials Enable 3D Cell Culture

Chair: **Maryam Tabrizian**

Session 4. Part I
Soft and Bio-materials

Session Chairs: **Derek Rosenzweig** and **Frej Mighri**

09:45 – 10:05 **Keynote Talk : Derek Rosenzweig** - Leveraging 3D biofabrication, bioengineering and biophysical approaches for musculoskeletal tissue regeneration and local therapeutic delivery

10:05 – 10:20 **Leandro S. Oliveira** - Preparation of hybrid films of locust bean galactomannans and starch from cassava peels

10:20 – 10:35 **Florina Daniela Cojocaru** - Polysaccharides-calcium phosphates beads for the treatment of osteoporotic fractures

10:35 – 10:50 **Frej Mighri** - Development and characterization of biocompatible porous PLA-Chitosan scaffolds without solvent treatment

10:50 – 11:05 **Piotr Rychter** - Hydrolytic degradation of methylene carbonate/lactide copolymers with functional, active carboxylic side groups as a carrier of biologically active agent, including drugs for use in dermatology and cosmetology

11:05 – 11:35 **Coffee Break**

Session 3.
Materials Processing and Manufacturing

Session Chairs: **Antanas Ciuplus** and **Regita Bendikiene**

11:35 – 11:50 **Rafał Zybala** - Residual stress measurement and properties investigation of cold sprayed titanium and titanium alloy coatings after laser surface treatment

11:50 – 12:05 **Katherine Pérez** - Formation of PEO coatings on binary material Mg-33wt%Ti processed by high energy ball milling (HEBM)

12:05 – 12:20	**In Gyeong Kim** - Manufacture of Invar Sheets Using a Continuous Electrodeposition Technique for the OLED FMM
12:20 – 12:35	**Sharon Koppka** - Influence of microstructure and porosity on bending strength of nanoporous, selective laser-sintered glasses
12:35 – 12:50	**Jorge Santos** - Effect of a physical vapor deposition film applied on decorative electroplated coatings of plastic substrates
12:50 – 13:05	**Anne-Marie Layher** - Additive Manufacturing of Preforms for Special Glass Fibres made of Al-doped Fused Silica
13:05 – 14:35	**Lunch**

Session 1. Part II
Materials Characterization

Session Chairs: **Joseph Poon** and **Lilia Sabantina**

14:35 – 15:05	**Invited Talk : Joseph Poon** - High-Entropy Alloys: Opportunities, Challenges, and Progress
15:05 – 15:20	**Huseyin Zengin** - Evolution of microstructure, mechanical properties and corrosion resistance of Mg–2.2Gd–2.2Zn–0.2Ca (wt%) alloy by extrusion at various temperatures
15:20 – 15:35	**Adriana S Franca** - Development of antioxidant films based on oil/water emulsions with sunflower proteins and cellulose nanoparticles
15:35 – 15:50	**Jakub Mokrzycki** - Assessment of ammonium ions removal from aqueous solutions using zeolite-composite materials derived from fly ash
15:50 – 16:05	**Constantin Mulaja Tshakatumba** - Tailings recycling into fired building bricks and anti-acid bricks
16:05 – 16:20	**Nadia Muhammad Hussain** - Characterization and Minimization of the Four-Point Probe for Direct Blood Impedance Measurements in Vacutainer Tube
16:20 – 17:50	**Coffee Break and Poster Session B**
20:00	**Conference Dinner at Abrassame**

Friday 21 Oct 2022

Session 4. Part II
Soft and Bio-materials
Session Chairs: **Roman Perez** and **Pierre Bagnaninchi**

09:00 – 09:30	**Invited Talk : Roman Perez** - Therapeutic biomaterials for the stimulation of tissue regeneration
09:30 – 09:50	**Keynote Talk : Pierre Bagnaninchi** - Imaging cell and tissue physical properties
09:50 – 10:05	**Martin Humenik** - Microstructured arrays based on self-assembled fibrillar networks for specific cell immobilization
10:05 – 10:20	**Raquel Giménez** - Soft functional materials by bottom-up 1D assembly of pyrazole dendrons
10:20 – 10:40	**Keynote Talk : Arnab Chanda** - Investigation of Mechanical Properties in Novel Auxetic Skin Grafts
10:40 – 10:55	**Faisal Abdelrahim** - Influence of Anodization Parameters on The Surface and Corrosion Resistant Characteristics of Titanium Nanotubes Formed on Ti Substrate in Simulated Body Fluids
10:55 – 11:30	**Coffee Break**

Session 2. Part II
Nanotechnology in Material Sciences and Engineering
Session Chair: **Zeinab Hosseinidoust**

11:30 – 12:00	**Invited Talk : Konstantin Neyman** - In-silico designing bimetallic nanoparticles
12:00 – 12:15	**Zeinab Hosseinidoust** - Self-Assembling Nanofibrous Viral Microgels as Sprayable Antimicrobials Targeting Multidrug-Resistant Bacteria
12:15 – 12:30	**Mansi Pahuja** - Ni-Foam-Graphene-CNTs-SnSeP: An efficient electrocatalyst covering universal pH range and tap water splitting for hydrogen evolution reaction
12:30 – 12:45	**Karolina Ogrodowska** - Nanosilica Modification of Epoxy Matrix in Hybrid Basalt-Carbon FRP Bars - Impact on Microstructure and Mechanical Properties
12:45 – 13:00	**Gema Tabares** - Fabrication of MoTe2(1-x)Se2x alloy-based hydrogen gas sensor
13:00	**Awards Ceremony and Closing Remarks**

Welcome from the Chairs

Dear colleagues, friends, and the wider material science community:

On behalf of the organizing committee, it is our great pleasure to invite you to the 4th International Conference of Materials, organized by MDPI's Open Access journal Materials. This conference will be held in the beautiful city of Barcelona from October 19 to October 21, 2022. The first three editions of the conference were in electronic format, and each was a great success. This has encouraged the organizing committee to take this tradition to the next level by organizing the 4th edition of this conference in Barcelona, where all stakeholders working on various aspects of materials science and material engineering can come together. The aim is to make this event a forum for discussion, knowledge exchange and fruitful interactions among participants in this exponentially growing field.

Stakeholders from academia and industry as well as from governments and research institutes are welcome to join this event and share their findings on various topics related to materials, such as:

- Materials Characterization
- Nanotechnology in Material Sciences and Engineering
- Materials Processing and Manufacturing
- Soft and Bio-materials
- Fibers and Membranes
- Optical, Electrical and Magnetic Materials

We are very enthusiastic about this 4th Materials Conference and are relying on you to make it a successful event.

We look forward to meeting you in Barcelona!

Prof. Dr. Maryam Tabrizian
Conference Chair

Editor-in-Chief of *Materials.*
McGill University, Canada

Prof. Dr. Filippo Berto
Conference Chair

Associate Editor-in-Chief of *Materials*. Norwegian University of Science and Technology, Norway

Materials (ISSN 1996-1944) is a peer-reviewed, open access journal of materials science and engineering published semimonthly online by MDPI. Materials provides a forum for publishing papers which advance the in-depth understanding of the relationship between structure, properties, and functions of all kinds of materials. It covers all aspects of materials science and engineering including synthesis, structure, mechanical, chemical, electronic, magnetic, and optical properties, as well as their various applications.

Among other databases, *Materials* is indexed by the Science Citation Index Expanded (Web of Science), MEDLINE (PubMed), and Scopus.

Journal Webpage: https://www.mdpi.com/journal/materials
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Abstracts

Poster Exhibition

A25. Aluminium TIG welding: AC versus DC

Regita Bendikiene, Rolandas Sertvytis, Antanas Ciuplys

Kaunas University of Technology, Lithuania

This study compares two ways to weld a aluminium. The tungsten inert gas (TIG) welding process was chosen. It has three options for welding current: direct current positive electrode (DCEP), DC negative electrode (DCEN), and alternating current (AC). Every method has pros and cons and is used in the welding of ferrous or non-ferrous metals. Generally, welding manuals recommend that DC is used for TIG welding of mild or stainless steel while AC for is used for welding aluminium. Aluminium, when exposed to air, forms an oxide layer that melts at a higher temperature than base metal. An AC positive cycle where the current flows from base metal to the electrode removes surface oxides more effectively than during a negative cycle. The positive cycle acts as a surface scrub, breaking up oxides while the necessary weld penetration is achieved during the negative cycle. Both cycles work to ensure high-quality integral welds. Cleaning the weld area with a stainless-steel brush is mandatory to assure it. The control of the heat input is another challenge in aluminium TIG AC welding. However, in the case of DC, these processes are performed without the above-mentioned problems. Good, deep welds are obtained in one pass. This operation not only creates a stronger weld but also reduces the time required. DC welding finds its application in repairing deep pits and gouges in aluminium products; a pit or cavity is quickly filled with molten metal keeping the filler in the right place, ensuring solidification of the joint, which needs to be smoothed afterwards, and then the part is like new. This method makes it possible to repair expensive machined parts that are slightly damaged. Even though AC has a surface-scrubbing effect which breaks up the oxide layer, providing the possibility to obtain good welds, unlike DC current, it cannot produce integral welds.


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