I4Bags

Workshop organiser:
Malgorzata Celuch (QWED, EMMC)

with technical assistance of:
Ernst-Dieter Janotka (EMMC)
Lukasz Nowicki (QWED)

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I4Bags Public Workshop

Partnership and Acknowledgements

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Ion Implantation for Innovative Interface modifications in BAttery and Graphene-enabled Systems

The work of the Polish partners is co-funded by the **Polish National Centre for Research and Development** under M-ERA.NET3/2021/83/I4BAGS/2022.

The work of the Belgian partners is co-funded by the **Service Public de Wallonie** under M-ERA.NET3.

M-ERA.NET 3 receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958174.

M-ERA.NET is a strong European network of public funding organisations supporting and increasing coordination and convergence of national and regional funding programmes on research and innovation related to materials and battery technologies to support the European Green Deal.

Agenda:

Workshop scheduled 14:00 – 17:00 (max)
Technical talks 20- 30 min each
Intro & concluding talks 10-15 min each

1. Welcome by EMMC
2. Introduction to I4Bags

   by Tymoteusz Ciuk (L-IMiF, Poland; I4Bags Coordinator)
3. Modelling-Based Characterisation of I4Bags Materials and Relevance to the EMMC Focus Area 1 “Model Development”

   by Malgorzata Celuch (QWED, Poland; EMMC FA1 Co-Chair)
4. Reduced Graphene Oxide-Based Electrodes: Application Perspectives in Novel Energy Storage Systems

   by Agata Romanowska (L-IMiF, Poland)
5. Ion implantation Potentials for Smart Materials. Applications in Energy Storage Industries

   by Aida Nasiri (IONICS, Belgium and also on behalf of MateriaNova, Belgium)
6. Ion Implantation for Graphene-Enabled Magnetic Diagnostics: Application Perspectives in Modern Fusion Reactors

   by Tymoteusz Ciuk (L-IMiF, Poland)
7. I4Bags Open Platform and Request to the EMMC for Modelling Inputs

   by Lukasz Nowicki (QWED, Poland)
8. Q & A session - Future Actions - Adjourn

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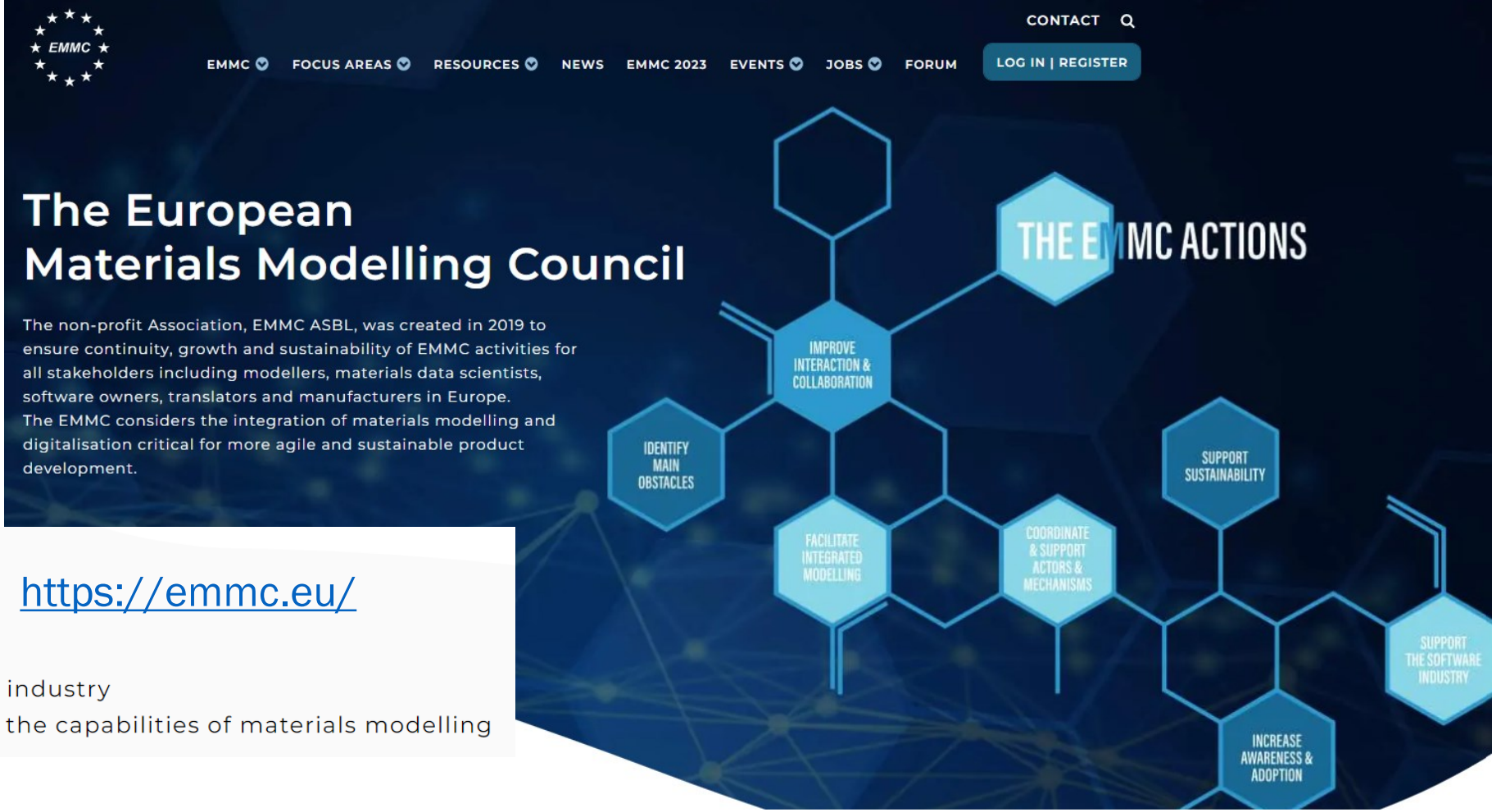
Model Development

Home | Focus Areas | Model Development

Objectives

- Promote the use of materials modelling in industry
- Promote actions and activities to enhance the capabilities of materials modelling



https://emmc.eu/

EMMC considers the integration of materials modelling & digitalisation critical for more agile and sustainable materials & product development.

New and improved materials and the use of existing materials in new applications are a key factor for the success and sustainability of European industry and society in general.

EMMC in 2024

- 10-year anniversary since EMMC started as a bottom-up association
- 5-year anniversary since founding EMMC ASBL

Focus Areas and Task Group Activities

Model Development

Interoperability

Digitalisation

Software deployment

Impact in Industry

Policy

Roadmap

FA Model Development

Model Development

Focus Area 1:

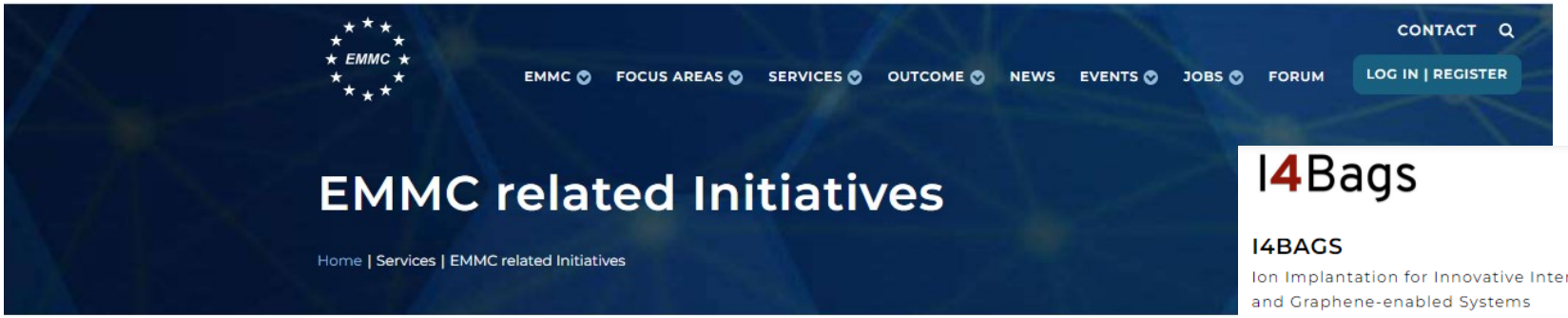
"Model development and validation"

"... stands for everything that has to do with the **capabilities** of materials models and modelling workflows, and **validation** of them. Application to challenging problems of industrial relevance in a range of domains also belong here.

Physics-based and data-driven in synergy!

I4Bags to EMMC Connections

emmc.eu/emmc-related-initiatives/



I4Bags

I4BAGS

Ion Implantation for Innovative Interface modifications in BAttery and Graphene-enabled Systems

The **I4BAGS** project aims to develop **innovative processing and characterisation solutions** for **microelectronics** and **battery applications**. Driven by topical challenges in communication and energy management, and supported by large industrial demand for innovation, most performing devices have a complex thin-film stacking architecture, the manufacturing processes of which require **fine monitoring of materials and their interface properties** .

This project aims to demonstrate the versatility of **low-energy ion implantation** (LEII) protocols as a processing tool to locally modify electronic, electrochemical and electrical properties in different materials and structures. The work is organised and results will be demonstrated on two platforms: materials for thin film solid state batteries (**TFSSB**) and materials for graphene-on-SiC-enabled systems (**GRSiC**).

Objectives: Low-energy ion implantation tailored for targeted application. Broad frequency range characterisation methods from DC to millimetre waves supported by suitable modelling and software. Generated data collected within Open Innovation Environment and disseminated throughout European materials' communities (EMMC, EMCC, AMI2030).

Target applications: electric transportation, smart metering, power applications and electricity storage.

The **I4BAGS Consortium** comprises partners from Poland and Belgium (Wallonia), connecting two research centres: L-IMiF (Lukasiewicz - Institute of Microelectronics and Photonics) and MateriaNova with two SMEs: QWED (EMMC Organisational Member) and IONICS.

The project is **co-funded** by the Polish National Centre for Research and Development under M-ERA.NET3/2021/83/I4BAGS/2022 and the Service public de Wallonie (SPW) under M-ERA.NET3.

Duration
Start: 01.09.2022
End: 31.08.2025

Read more

24.05.2024

I4Bags to EMMC Connections

emmc.eu/members/

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EMMC ASBL Organisational Members

LIST - Luxembourg Institute of Science and Technology
Luxembourg
Computational Mechanics, Computational Electromagnetics, Composite Materials Design and Processing

Materials Design
France
Software, Support, Contract Research

NLR - Royal Netherlands Aerospace Centre
Netherlands
Aerospace, Civil Aviation, Space, Defence, Sustainability,

Norwegian University of Science and Technology (NTNU)
Norway
Ontology, multiscale, workflow, interoperability, materials research

NTUA/RNanoLab
Greece
CFD & Reactor Design, Chemical kinetics, Structure-activity relationship (SAR), Pharmacokinetic modelling, Machine Learning & AI

QWED Sp. z o. o.
Poland

SINTEF AS
Norway
Applied research, technology, innovation

Software for Chemistry & Materials
Netherlands
Computational Chemistry, Density Functional Theory, Machine Learning, Parametrization, Multiscale simulations

Synopsys QuantumATK®
Denmark
Software solutions, molecular and atomic-scale, Materials design, multiscale

QWED Sp. z o. o.

Website | Contact

General description of organisation

QWED is a hi-tech SME based in Warsaw, Poland. It develops and comercialises computer simulators of electromagnetic and multiphysics processes as well as instruments for precise measurements of electromagnetic properties of materials.

Founded in 1997 by four ambitious academics from the Warsaw University of Technology, QWED has been on the market for 25+years, on average employing 10+ R&D engineers, while successfully competing with international corporations of 10000+ employees.

QWED's research and products have received prestigious awards, starting with the European Information Technology Prize (1998) and the Prime Minister of Poland Award (1999), up to the most recent recognition under the European Horizon 2020 Innovation Radar reachning the Finals of the 2021 Innovation Radar Prize.

Information on projects, services, products

QWED flagship products are:

- QuickWave™ selectromagnetic and multiphysics simulation software, based on the in-house conformal FDTD engine, operated through different Graphical User Interfaces (from the industrial standard Autodesk® Inventor® Software to FreeCAD-based QW-Modeller), and enhanced with advanced materials' models and libraries;

- microwave and millimetre-wave resonators (including an industry-standard SPDR defined by IEC 61189-2-721:2015), which work as material test-fixtures connected to any popular Vector (or even Scalar) Network Analyser; QWED's Materials Measurements Suite software facilitates exceptionally fast and accurate characterisation of materials in lab and fab environments.

QWED's mission is to provide high-quality products and services that meet the specific needs of our clients across the globe, in various sectors including telecommunications, radioastronomy, aerospace, automotive, materials science and manufacturing, food processing, biomedical, microwave chemistry, and other microwave power applications. QWED offers industrial consultancy and design, and willingly participates in European R&D projects (FP6, FP7, H2020, EUREKA, ERA.NET), which help the company develop new competencies, address new markets, and contribute to the European excellence. The most recently completed projects have been H2020 MMAMA and NanoBat, while ongoing are M-ERA.NET I4BAGS and ULTCC6G_EPac. The team is open to new collaborations in the EMMC areas!

Welcome to the EMMC!

welcome movie:

https://emmc.eu/emmc-members/mission/