

# SAFE AND SUSTAINABLE BY DESIGN GRAPHENE/MXENES HYBRIDS



## e-NEWSLETTER *Magazine*

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## 1. SAFARI at Coatings 2026

### ADVANCING SAFE AND SUSTAINABLE COATING TECHNOLOGIES

SAFARI made a strong impact at COATINGS 2026, where consortium partners presented the latest advances in graphene- and MXene-based materials developed under the Safe-and-Sustainable-by-Design (SSbD) framework.

The conference provided an excellent opportunity to showcase how SAFARI is moving beyond laboratory research towards scalable, industrially relevant technologies for advanced coatings, electrochemical devices, and functional materials.



Figure 1: Presentation at Coatings 2026

#### Among the highlights were:

- Scalable coating technologies - Łukasiewicz-PIT presented innovative MAX phase ceramic coatings produced by aerosol cold spray technology, demonstrating a promising route for manufacturing durable, high-performance coatings with industrial potential.

The SAFARI's  
Newsletters:

Throughout the 42-month project, we'll be releasing multiple e-newsletters, each showcasing the milestones achieved by our partners in development of 2D materials using safe and sustainable practices.



## 1. SAFARI at Coatings 2026

- Next-generation electrochemical materials, CREATIVE NANO showcased Layer by Layer MXene-graphene hybrid electrodes, designed to deliver enhanced sensitivity, stability and reproducibility for future electrochemical sensing applications.
- Greener manufacturing processes - A second contribution from Creative Nano introduced Ni/Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene nanocomposite coatings produced using a boric acid-free electrochemical deposition process, highlighting SAFARI's commitment to reducing hazardous chemicals while maintaining excellent material performance.
- Beyond technological innovation, SAFARI also contributed to the workshop "SSbD in Practice: Current Status, Critical Barriers & Success Cases," where consortium partner ISQ shared practical experience on integrating Safe-and-Sustainable-by-Design principles throughout the research and innovation process.



Figure 2: Highlights from Coatings 2026

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## 2. 30M meeting at Aimen

### SAFARI REACHES AN IMPORTANT MILESTONE AT THE 30-MONTH CONSORTIUM MEETING

In May 2026, the SAFARI consortium gathered at AIMEN Centro Tecnológico in Pontevedra, Spain, for the project's 30-Month Consortium Meeting. Over two productive days, partners reviewed technical progress, discussed upcoming milestones, and aligned on the roadmap for the final phase of the project.

The meeting focused on the significant advances achieved across the project, particularly in the functionalization of MXenes and the development of graphene/MXene hybrid materials. Consortium partners held in-depth discussions to identify the most promising MXene candidates for future applications, evaluating their performance alongside SSbD criteria to ensure that innovation is developed responsibly from the earliest stages.



Figure 3: 30M Meeting at AIMEN in Pontevedra

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## 2. 30M meeting at Aimen

In addition to the scientific and technical achievements, partners exchanged updates on materials production, safety and sustainability assessments, data integration, dissemination activities, and exploitation strategies, reinforcing the multidisciplinary nature of the SAFARI project.

The meeting also provided an excellent opportunity to strengthen collaboration among consortium members and to visit AIMEN's state-of-the-art research facilities, offering valuable insights into advanced manufacturing and materials processing capabilities.

As SAFARI enters its final project phase, the consortium is well positioned to transform its research achievements into innovative, scalable, and sustainable solutions for future applications in advanced coatings, biosensors, conductive inks, and electromagnetic interference shielding.

Many thanks to our host, AIMEN Centro Tecnológico, for the excellent organisation, warm hospitality, and the opportunity to showcase their outstanding facilities. Together, we continue building the future of safe and sustainable 2D materials.



Figure 4: AIMEN Centro Tecnológico

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## 3. Internal training activity

### SELECTION OF MXENES MOST PROMISING FOR THE END USER APPLICATION:

One of the highlights of the 30-Month Consortium Meeting was an interactive internal training session dedicated to one of SAFARI's most important challenges: how to identify the most promising MXene-based materials for further development using SSbD principles.

Over the past two and a half years, SAFARI researchers have successfully developed an extensive portfolio of functionalised MXenes and graphene/MXene hybrid materials through multiple synthesis and functionalisation routes. With more than 50 material combinations available, selecting the best candidates for future development required a structured, multidisciplinary approach.



Figure 5: Internal Training activity SAFARI

During the session, partners worked together to define a common selection strategy that balances three key dimensions:

Technical performance for targeted applications, including biosensors, conductive inks, and electromagnetic interference (EMI) shielding;

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## 3. Internal training activity

Safety considerations, ensuring that potential risks are addressed from the earliest stages of material development.

Sustainability criteria, supporting environmentally responsible innovation and future regulatory readiness.

The training brought together experts from across the consortium, including <sup>2</sup> materials scientists, application developers, toxicologists, sustainability specialists and SSbD experts. Through collaborative discussions, partners aligned methodologies, shared expertise, and established common criteria for evaluating candidate materials.

Another important outcome was the agreement on improved material traceability and monitoring procedures, ensuring that each material can be tracked throughout its lifecycle, from synthesis and characterisation to safety assessment, sustainability evaluation and application testing.

By strengthening collaboration across work packages and promoting a shared understanding of SSbD implementation, this internal training represents an important step towards developing safe, sustainable and high-performance 2D materials that are ready for future industrial applications.



Figure 6: SSbD Training: Building Safe and Sustainable 2D Materials

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## 4. Upcoming Events

# UPCOMING EVENTS

### WHERE YOU WILL FIND US:

The SAFARI consortium continues to share its latest research and engage with the international scientific and industrial community. If you're attending any of the following events, we'd be delighted to meet you and discuss the future of SSbD 2D materials.

📍 **Graphene Week 2026**  
21-25 September 2026 | Porto, Portugal

SAFARI partner AIMEN will present the poster:  
"Safe and Sustainable by Design Production of Niobium MAX Phases and MXenes"

Join us to discover how SAFARI is developing innovative production routes for next-generation MXene materials while integrating safety and sustainability from the earliest stages of material design.



Figure 7: Graphene Week 2026 Banner

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### WHERE YOU WILL FIND US:

📍 SETAC Europe 27th LCA Symposium  
19-21 October 2026 | Bruges, Belgium

At the symposium, AIMEN will showcase: ,  
"Safe and Sustainable by Design Functionalised MXenes:  
Environmental Impact Comparison through Life Cycle  
Assessment (LCA)"

This work highlights how Life Cycle Assessment supports the  
development of environmentally responsible MXene  
technologies and contributes to informed decision-making  
throughout the innovation process.



Figure 8: SETAC Europe Banner

📍 SSbD26 Conference  
9-11 November 2026 | Stockholm, Sweden

SAFARI partner ISQ will present:  
"Safe and Sustainable by Design Assessment of 2D MXenes and  
MXene/Graphene Hybrids: The SAFARI Project Approach"

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## 4. Upcoming Events

### WHERE YOU WILL FIND US:

The presentation will demonstrate how SAFARI integrates technical performance, safety, sustainability and regulatory considerations into the development of advanced 2D materials, showcasing the project's holistic SSbD methodology.



Figure 9: SSbd 2026 Banner

### Let's Connect!

Whether you're a researcher, industry representative, policymaker or innovation stakeholder, we look forward to meeting you at these events. Come and discover how SAFARI is helping shape the next generation of safe, sustainable and high-performance 2D materials.

Follow our website and LinkedIn page for updates on upcoming conferences, publications and project news.

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UPCOMING  
EVENTS



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