EUROPEAN CLUSTER COLLABORATION PLATFORM

Leading the twin transition: Advanced materials as key enabling technology

Summary

EU Clusters Talks
10 April 2024, 8:30 – 9:45 CET

An initiative of the European Union

Leading the twin transition: Advanced materials as key enabling technology

The European Cluster Collaboration Platform, on behalf of the European Commission, organised the EU Clusters Talk "Leading the twin transition: Advanced materials as key enabling technology" on 10 April, 8:30 – 9:45 CET, to present the strategy to move towards EU industrial leadership in advanced materials, discuss the challenges, and hear about cluster activity in this field.

Agenda of the meeting

Moderation: Andrew Lansley

1. News from the European Cluster Collaboration Platform
2. Advanced materials for EU industrial leadership
   Philipp Runge, Legal and Policy Officer, DG GROW, European Commission
   Sofie Nørager, Deputy Head of Unit, DG RTD, European Commission
3. Panel debate
   Annabelle Sion-Henry, Head of European Affairs, POLYMERIS
   Eva Milella, President, IMAST Italian technological district for the engineering of polymeric and composite materials and structures
   Magdalena Cholewińska-Falarz, Chief Innovation Officer, Silesian Nano Cluster
4. Funding opportunities

Key messages

- There is an increasing demand for advanced materials across various sectors, which is why the EU's strategy for advanced materials for industrial leadership seeks to bolster the resilience and strategic autonomy of the EU in this regard.
- The actions include accelerating research and technology development, scaling up innovation, enhancing manufacturing capacities, and stepping up the industrial uptake.
- Challenges related to sustainability lie in in recyclability, performance under extreme conditions, weight reduction, and raw material supply.
- Digital technologies can be very helpful for material design and characterisation.
- Collaboration between research and industry is key and require the necessary support infrastructure, e.g., testing facilities.

1. News from the European Cluster Collaboration Platform

After the introduction by moderator Andrew Lansley, the following news items were presented:

1. Register now for the European Cluster Conference on 7-8 May 2024 and the matchmaking event.
2. Save the date for Clusters meet Regions in Graz, Austria, on 18-19 June 2024.
3. Register for the EU – Taiwan Matchmaking Event in Germany on 10-12 June 2024 and the respective info webinar to get all the details on 18 April, 9:30 – 10:30 CET.
4. Register for the EU – South Med Matchmaking Event in Germany on 11-13 June 2024.
5. Open public consultation on the Single Market Programme until 31 May 2024.
6. EEN Training Session on Sustainable Finance on 11 April 2024.

2. Advanced materials for EU industrial leadership

Philipp Runge, Legal and Policy Officer, DG GROW, European Commission

Sofie Nørager, Deputy Head of Unit, DG RTD, European Commission

Philipp Runge and Sofie Nørager presented the main actions, scope, and vision behind the European Commission communication on advanced materials for industrial leadership. Sofie Nørager highlighted that this initiative, adopted on 27 February 2024, takes the definition of advanced materials according to the OECD and covers intentionally design and engineered materials to achieve **specific or improved functional performance**. These materials can be high-tech (emerging from innovative manufacturing processes) and low-tech (traditional manufacturing). Advanced materials have widespread applications across numerous fields, which shows their significance in today's society.

Philipp Runge spoke about their importance in achieving the Green Deal objectives and the digital transition in Europe. These materials are seen as crucial for **driving innovation across various sectors**, for example in clean energy technologies. They also hold the potential to substitute certain critical raw materials, a consideration under the Critical Raw Materials Act. He also emphasised the **increasing demand for advanced materials**, for example in construction, mobility, and semiconductors, since advanced materials can enhance efficiency and lead to the creation of more sustainable products. Looking at the state of play regarding advanced materials, the EU holds 15% of all patents in this sector. This figure is substantial but not leading globally. The overall ambition of the EU's strategy for advanced materials for industrial leadership is to bolster the resilience and strategic autonomy of the EU by accelerating research and technology development, scaling up innovation, enhancing manufacturing capacities, and stepping up the industrial uptake.

The five pillars of the strategy are:

- Pillar 1 "**Research and Innovation**" sets common research and innovation objectives and priorities, co-created with Member States and in consultation with stakeholders. The initial

focus areas are energy, mobility, construction, and electronics. It also identifies research and innovation needs for substituting critical raw materials with advanced materials.

- Pillar 2 "**Lab to Fab**" seeks to accelerate the design and development of advanced materials. A key initiative is the "Material Commons" to establish a European digital infrastructure. Another action focuses on creating a single-entry catalogue for technology infrastructures.
- Pillar 3 "**Capital Investment and Financing**" aims to address the need for substantial private and public financial resources to support the development and application of advanced materials. A public-private Horizon Europe Partnership "Innovative Materials for EU" will give €500 million in funding. The Commission will incorporate innovative and advanced materials in to the "Important Projects of Common European Interest (IPCEI)". Among other financial instruments such as the Innovation Fund, InvestEU, and the Strategic Technologies in Europe (STEP) platform, the European Innovation Council will provide around €130 million in funding.
- Pillar 4 "**Production and Use**" concentrates on ensuring that Europe has the capacity to utilise and commercialise advanced materials effectively. They will work with public procurers, launch an Advanced Materials Academy, improve standards, and analyse the production, use and patent landscape of advanced materials.
- Pillar 5 "**Governance**" involves setting up a structure to monitor the various actions. This governance framework will also facilitate ongoing discussions and adjustments to priorities based on investment outcomes and emerging needs. The different work strands will be coordinated by a Technology Council.

3. Panel debate

Anabelle Sion-Henry outlined their commitment to supporting the twin transition through circular economy, advanced manufacturing, and the development of advanced materials with enhanced properties and functionalities. The cluster is leading three European projects: AMULET, focusing on advanced materials for lightweight applications; POLREC, a Eurocluster project aimed at recycling polymer materials; and POLYTRONICS, which leverages artificial intelligence for the advanced manufacturing and design of materials. She said that the vision for materials of the future should not only encompass technological advancements and superior performances but also sustainability, recyclability, and safety. Related to polymers, she highlighted the **challenges in recyclability, performance under extreme conditions, weight reduction, and raw material supply**. To tackle the recyclability challenge, projects need to focus on the entire value chain—from collection and sorting to mechanical and chemical recycling processes. Cross-sectoral collaboration, where materials from one sector could be recycled and repurposed in another, is an important strategy.

Eva Milella mentioned that their initiatives focus on additive manufacturing with stakeholders from defence, automotive, and pharmaceutical sectors collaborating to produce prototypes across diverse applications. They also tackle significant challenges in thermoplastic structural composites. In addition to the sustainability challenge, she spoke about **stakeholder collaboration, digital integration, and artificial intelligence**. They are working on accelerating characterisation methods through machine learning, AI, and digital twins to manage the vast data from various sources effectively. AI is a powerful tool for material design because it enables rapid selection and characterisation of material properties

and helps foster innovation in new material development. The cluster's goal is to bridge traditional materials engineering knowledge with digital competencies.

Magdalena Cholewińska-Falarz explained that their cluster plays a multifaceted role in the nanotechnology industry, encompassing policy advocacy, education, and support. It actively participates in smart specialisation working groups at both national and regional levels and advising ministry and regional institutions on prioritising development areas within advanced materials. **Nanotechnology** is as a critical area within advanced materials due to its interdisciplinary nature and significant impact across various industries. Applications span energy, sustainable materials development, and the creation of new semiconductors and sensors. These advancements are instrumental for digitalisation and the development of smart devices. Therefore, the cluster offers **workshops and training sessions** for its members, spanning chemistry, physics, bioengineering, and material science. It also promotes courses and training opportunities from other institutions to support the upskilling of professionals in this rapidly evolving sector.

Sofie Nørager advocated for a coordinated approach to improve the **visibility and accessibility of testing facilities** across Europe. A key issue is the dispersion of open innovation test beds and technology infrastructures, which can pose difficulties for SMEs seeking to find and utilise facilities closest to them or best suited to their needs. To address this challenge, a survey is being conducted to map out the available technology infrastructures across Europe. The data will be integrated into a centralised platform.

Regarding the **collaboration between research and industry**, Annabelle Sion-Henry explained their networking and collaboration between research institutions and industrial actors within the materials science domain. They leverage a scientific committee comprised of research members who provide strategic direction and monitor regulatory developments at regional, national, and European levels. This committee is supportive in identifying new opportunities for SMEs. The cluster also operates a European Digital Innovation Hub focusing on advanced materials and the integration of artificial intelligence to enhance product development and manufacturing processes. By pooling experts from diverse fields, including data analysis, digital technology, and materials science, the hub ensures that SMEs receive comprehensive support tailored to their specific challenges and goals. Eva Milella confirmed the need for improvements in the **support infrastructure** available to startups and entities working on prototypes at a pre-industrial level. While universities and research institutions offer ample resources for basic-level research and initial testing, there is a gap in the availability of facilities capable of producing prototypes on a larger, more industrially relevant scale. This kind of support would be crucial for facilitating the commercialisation of new technologies, particularly in the high-demand field of composites for aeronautical and other transportation-related applications.

Speaking about investments, Magdalena Cholewińska-Falarz observed a **growing interest from venture capital firms and investors** in the field of natural products nanotechnology, particularly its applications in medicine. The investment cycle in such deep tech technologies often extends beyond the short term, sometimes lasting up to a decade, which is why investors need to adopt a more patient capital approach.

Talking about the relation between **advanced materials and critical raw materials**, Philipp Runge emphasised the significance of the Critical Raw Materials Act within the context of the EU's discussions on resilience and strategic autonomy. Raw materials are unlikely to be substituted by new materials in

the short term. However, the long-term perspective opens up potential for the development and integration of advanced materials. The Critical Raw Materials Act acknowledges this future potential alongside the current dependence on critical raw materials.

4. Funding opportunities

Closing the EU Clusters Talk, Nina Hoppmann shared the following examples of funding opportunities:

1. Invitation to explore the new EU Funding & Tenders Portal
2. EIT Raw Materials Booster Call 2024-2025 for Start-ups and SMEs; deadline 27 May 2024
3. Data Space for Manufacturing; deadline 29 May 2024
4. EU-Ukraine Cluster Partnership Programme; deadline 4 June 2024; info session on 22 April 2024 at 9:30 CET
5. Opportunities for SMEs: Calls from Euroclusters; published on European Cluster Collaboration Platform