EMMC ASBL, Avenue Louise 54, 1050 Brussels, Belgium

EMMC Position on the Advanced Materials Act

Introduction

EMMC ASBL is an association that brings together stakeholders with an interest in materials modelling and digitalisation, including scientists developing materials models and related ML/AI methods, software developers and distributors, including free and open sources as well as proprietary software, industrial end users as well as consultants and so-called translators (intermediaries).

In line with the objectives of EMMC, the following comments respond to the Call for Evidence specifically relating to the stated problems and possible solutions regarding research and innovation (R&I). More widely, EMMC supports the position paper submitted by IAM-I [1].

The ecosystem

Advanced materials research and innovation has been and still is one of the European key strengths. However, there is a need for action to prevent a decline in innovation and technological leadership [2]. The translation of leading academic research to industrial innovation is not working well, and at the same time, the field is undergoing a rapid transformation due to the AI and robotics/automation revolution. Digitalisation, including the combination of modelling and experiment, supported by AI/ML, the improved management of data and knowledge, is rapidly changing the R&I landscape.

The current industrial landscape related to materials needs to be broken down into the following players: (a) large chemicals and materials companies, (b) “traditional” materials SMEs that are often based on a specific materials innovation from academia, and (c) “materials tech industry”, i.e. companies that have a novel business model to develop materials IP typically based on advances in AI and robotics.

In addition, Europe has a very strong ecosystem in materials digitalisation fields including materials modelling, informatics, high performance computing and AI. Most of the world-leading materials modelling software is European, and most of the world-leading software companies are European, (e.g. Siemens, Dassault Systèmes, Hexagon) or have their materials-related divisions in Europe (e.g. Ansys-Granta).

Problems relating to R&I

In conjunction with the above analysis, we have identified some deficiencies and inefficiencies of the European advanced materials R&I ecosystem, as follows. Both the “traditional” materials SMEs and the materials tech industry need better and easier access to shared research and technology facilities furnished with specialised equipment to support the entire R&I cycle of advanced materials, and data management that is integrated into an overarching digital infrastructure without compromising data sovereignty and IP.

In addition, digitalisation is lagging behind in the more traditional materials SMEs, including the use of advanced modelling, decision-support systems, data management and AI. All players, but in particular the more traditional SMEs lack access to data. This includes the wealth of data that are created in research projects which, despite many years of data management plans, lack FAIR data implementation. Also, there is a lack of an overarching governance system for materials data in Europe that takes into account the incentives for contributing open data as well as the need to manage proprietary data, and to do so from an end-user, materials science perspective rather than an IT perspective. The field also struggles with a talent gap, more and more so as the field requires a combination of materials science and digital skills.

Addressing the problems; Objectives of the Advanced Materials Act

EMMC supports the objectives outlined in the draft document. However, it is important to note the actual strengths the EU can build on to advance the digitalisation of the advanced materials R&I process, as well as current weaknesses. We note in particular EU strengths in materials modelling and high-performance computing, as well as emerging capabilities in semantic data and knowledge management. On the other hand, with some notable exceptions (such as NOMAD and crystal structure databases), Europe lacks data and certainly "big data" in the advanced materials field. Hence, data infrastructures (see below) as well as initiatives are required that ensure reliable, interoperable, AI-ready data are produced by materials characterisation and physics-based modelling.

In relation to the need to "Increase EU R&I capacities and the uptake of advanced materials", we broadly support the IAM-I [1] Key recommendations 4 and 5:

- Strengthen overall R&I capabilities and capacities and associated services to accelerate innovation and reduce cost and time-to-market.
- Establish federated data ecosystems on materials data (Materials Commons) as a digital infrastructure for data, modelling and AI-driven materials design and development.

It must be ensured that the R&I capabilities include digitalisation and that the capacities and services are closely integrated with the digital infrastructure (Materials Commons). All of the above must further be backed up by training and up-skilling in digital aspects of advanced materials, including modelling, FAIR data and AI.

[1] https://www.iam-i.eu/wp-content/uploads/2026/01/Position-Paper-IAM-I-Advanced-Materials-Act.pdf
[2] Albora, G., Benoit, F., Caldarola, B., Di Girolamo, V., Diodato, D. et al., *Path to innovation – An economic complexity analysis of technological perspectives in the EU – Advanced materials*, Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2760/6124424