Feedback on the Advanced Materials Act

Input from EIC Engineered Living Materials (ELM) Portfolio Projects:
REMEDY, Bio-HhOST, BIOACTION, Fungateria, LoopOfFun, SUMO

The EIC Engineered Living Materials (ELMs) portfolio comprises 10 collaborative projects, bringing together a broad network of partners across Europe, including leading universities, research institutes, and SMEs, and collectively covering the comprehensive European research and innovation landscape in the ELMs field.
ELMs represent a rapidly emerging class of advanced materials with transformative potential across various sectors, including health, manufacturing, energy, construction, and the environment, thanks to their distinctive properties such as sensing, responsiveness, adaptability, and self-repair. By incorporating living cells, ELMs represent a fundamental change in how materials are produced and the functions they can perform, with the potential to decrease costs and environmental impact. To fully unlock this potential, specific actions are essential to reinforce Europe's research and innovation ecosystem, industrial scale-up pathways, investment framework, and regulatory preparedness. The EIC ELM portfolio strongly supports the objectives of the proposed Advanced Materials Act and welcomes the Commission's ambition to accelerate the development, production, and uptake of advanced materials across the EU.

1. Strengthening the EU research and innovation ecosystem

Europe has a strong scientific base in advanced materials, including bio-based and living systems. However, the transition from breakthrough research to industrial deployment remains slow, especially for disruptive material classes such as engineered living materials, where development timelines are lengthy, and risks are high.

Key recommendations

- Full-cycle innovation support: Introduce harmonised EU-wide incentives covering discovery, prototyping, scale-up, and early deployment to bridge the "valley of death" for high-risk advanced materials.
- Shared R&I infrastructures: Ensure structured access to high-throughput experimentation, advanced characterisation, pilot-scale facilities, and digital infrastructures (including AI-enabled design) to reduce development time.
- Interdisciplinary skills development: Support training programmes that combine materials science, biotechnology, synthetic biology, AI, engineering, and circular design, in alignment with Industry 5.0 principles.
- Early detection of emerging technologies: Strengthen EU foresight and monitoring capacities for advanced materials by supporting assessments of societal, environmental, and regulatory implications.
- AI and Digital Twins: Foster the role of AI-driven design and digital twins for predictive modelling and accelerated development of advanced materials.

2. Increasing production capacity and industrial uptake

Engineered living materials and other advanced materials face significant barriers to scale-up and adoption, particularly where sustainable and circular production models initially increase costs. Fragmentation across value chains further limits Europe's ability to compete globally.

Key recommendations

- Value-chain investment: Support coordinated investments from pilot lines to demonstration plants and industrial integration.
- Demand-side measures: Implement procurement schemes, standards, and incentives that reward demand for low-carbon, circular, and high-performance advanced materials.
- Improved IP valorisation: Enable effective transfer, sharing, and development of IP generated through EU-funded research, reducing the risk of strategic knowledge loss.
- Industry 5.0 integration: Promote human-centric, sustainable, and resilient manufacturing models as a competitive differentiator for European industry.
- Talent Attraction: Propose measures to retain and attract top talent in deep-tech materials, including mobility schemes and incentives for interdisciplinary careers.

3. Improving the investment landscape for deep-tech materials

Advanced materials ventures, particularly in engineered living systems, require long development timelines and patient capital. Current investment mechanisms remain insufficient for pre-industrial, infrastructure-intensive technologies.

Key recommendations

- Dedicated public–private investment mechanisms: Establish early-stage investment schemes tailored to deep-tech advanced materials, providing long-term, risk-tolerant capital and a structured pipeline from EU-funded research to industrial deployment.
- Support for orphan technologies: Ensure promising technologies are not lost due to fragmented or short-term funding.

4. Environmental sustainability and strategic autonomy

Engineered living materials offer unique opportunities for low environmental impact and low-energy production, and the substitution of critical raw materials.

Key recommendations

- Incentivise environmental sustainability from early R&I stages.
- Establish guidelines and precise metrics for classifying advanced technologies concerning their environmental sustainability. Provide support for the development of Life Cycle Assessment methodology for unique advanced materials classes at their early R&I stages
- Support technologies for disassembly, recycling, and closed-loop systems.
- Promote sustainable alternatives to critical raw materials to strengthen Europe's open strategic autonomy.
- Bio-based feedstocks: Promote the use of renewable biological resources to reduce dependency on fossil-based inputs.

5. Streamlined regulation and faster time to market

Novel material classes, including living and biohybrid materials, face regulatory uncertainty and lengthy approval processes that delay deployment.

Key recommendations

- Clarify the interface between engineered living materials and advanced therapy medicinal products (ATMPs), including stem-cell-derived and bioengineered tissues, particularly where living constructs serve both material and therapeutic functions.
- Ensure that living cells and tissues developed for transplantation biology are recognised within the Advanced Materials Act at the research, manufacturing, and scale-up stages, without duplicating existing clinical regulatory pathways.
- Support regulatory coordination for bioengineered grafts, living scaffolds, and organoid-based constructs that combine material performance with biological integration.
- Regulatory sandboxes: Establish EU-wide sandboxes and harmonised approval pathways for novel advanced materials.
- Early regulatory dialogue: Provide clear guidance and early engagement with regulators, particularly for materials involving biological functions, AI-assisted design, and sustainability assessments. Promote coordination among the EU and Member States regulatory bodies and the developers of the novel advanced materials.

Conclusion

The Advanced Materials Act can become a cornerstone of European competitiveness, resilience, and sustainability. For emerging fields such as engineered living materials, success will depend on combining scientific excellence with effective scale-up pathways, patient investment, demand stimulation, and adaptive regulation.

The EIC Engineered Living Materials portfolio recommends that the Act:

- Supports full-cycle innovation from research to market
- Reinforces shared infrastructures and interdisciplinary knowledge and skills
- Establishes dedicated early-stage investment mechanisms
- Stimulates industrial uptake through procurement and standards
- Embeds environmental sustainability across value chains
- Accelerates time to market through regulatory sandboxes and guidance,
- Strengthens monitoring of emerging advanced materials technologies with a rapid response mechanism to emerging social needs.
- Translates into the specific needs of European healthcare systems, where the industrial healthcare sector must respond.

With these measures, Europe can significantly reduce time to market, reinforce open strategic autonomy, and lead globally in next-generation advanced materials.