

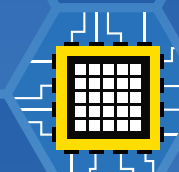


CORDIS Results Pack on Open Innovation Test Beds

A thematic collection of innovative EU-funded research results

May 2023

Improving access to knowledge to accelerate European innovation



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Editorial

Improving access to knowledge to accelerate European innovation

Europe's tech industries face high capital costs and complex regulation. Knowledge sharing hubs can lower these barriers and bring products to market faster. This updated Results Pack on Open Innovation Test Beds showcases 10 EU-funded projects that are helping to bring new innovations to the market faster.

The development of innovative advanced materials is essential to meet Europe's long-term economic, technological and environmental goals. Composite materials are used in a broad range of applications, from medical devices to automobile parts, the pharmaceutical, energy construction industries, and much more. Compared to existing materials, these composites are stronger, lighter, more sustainable, less toxic, and have functionalities such as flameproofing, scratch resistance, biosafety and embedded electronics.

European small and medium-sized enterprises (SMEs) and industries working in these ecosystems face important challenges. They need to test and validate new and essential technologies before commercialisation. At the same time, the speed and complexity of innovation is increasing, and high capital investment is demanded. Often, SMEs and industrial start-ups cannot afford to invest in their own testing and validation infrastructures.

That is why the EU invested more than EUR 319 million to support access to Open Innovation Test Beds (OITBs). These provide access to the physical facilities and services required for the development, testing and upscaling of nanotechnology and advanced materials.

This open innovation model has the potential to reduce costs, investment risks and the time to market for nano-enriched materials, making it especially attractive to SMEs. In addition, it may harmonise conditions for materials characterisation, modelling and upscaling to improve market access. This can make nanotechnology and advanced materials accessible to all industrial sectors, and thereby boost the transition to greener technologies.

OITBs have an untapped potential to deliver on the EU's transition to green and digital technologies across seven key technology domains: lightweight nano-enabled multifunctional materials and components; safety testing medical technologies; nano-enabled surfaces and membranes; bio-based nanomaterials and solutions; functional materials for building envelopes; nanopharmaceuticals production; and climate-neutral and circular materials technologies; in addition to two cross-cutting OITBs for material characterisation and modelling.

By pooling resources and existing knowledge at the EU level, while supporting all kinds of users independently of their geographical location, OITBs stimulate collaboration across Europe, contributing to the creation of a more open and connected innovation ecosystem. OITBs also grow these ecosystems as users set up networks amongst themselves to offer additional services, to allow experiments and knowledge to be shared, and to provide users with a single entry point to their capabilities and services in materials development.

The implementation of OITBs is expected to foster European networks of competence along the entire value chain and match the needs of the industry by providing users with easy access to widely distributed facilities. Together, this accelerated innovation will create jobs, grow economies and help deliver Europe's ambitions for a greener planet.

Zero-defect manufacturing of sheet metal products

The EU-funded FormPlanet offers an Open Innovation Test Bed for advanced sheet metal characterisation, helping to cut waste and increase productivity.



What do cars, aircraft, beer cans, washing machines, surgical tables and kitchen utensils all have in common?

They depend on sheet metal.

One of the fundamental forms used in metalworking, sheet metal is a thin, flat piece of metal [formed by an industrial process](#). "Because sheet metal is an essential material in such a wide variety of products, reliable sheet metal forming is a critical

manufacturing process," says Eduard Piqueras Jover, collaborative research and innovation project coordinator at [Eurecat](#), the Technology Centre of Catalonia.

Sheet metal forming is an industrial process used to create a metal part. Instead of cutting and removing the part from the sheet, the forming process applies force to the sheet, causing it to form into the desired shape. However, this is far from straightforward.

"The challenge is that today's high-performance sheet metals are subject to cracking and have limited formability," explains Jover. "Even more challenging is that it is incredibly hard to predict how a specific sheet metal will react to forming."

Solving common problems in sheet metal forming

Answering this challenge is [FormPlanet](#) (Sheet metal forming testing hub). Developed with the support of EU funding, FormPlanet is an Open Innovation Test Bed offering advanced sheet metal characterisation methodologies, non-destructive in-process measurements, and a range of modelling approaches.

The innovative methods developed in the project provide solutions to common industrial problems in sheet metal forming. These include edge cracking, hydrogen embrittlement, formability-related cracks, and non-expected part performance, all of which can cause productivity losses or inaccurate quality assessments.

"FormPlanet offers techniques for optimising the development and forming processes of high-strength sheet metals, thus improving the manufacturing process of complex and lightweight parts," notes Jover.

The platform's advanced characterisation and modelling methods have proved to be effective at improving sheet metal performance prediction and reducing production losses. Based on testing, demonstrations and case studies, the project showed that companies adopting the FormPlanet platform into their workflow improved their manufacturing and forming processes.

"Participating companies found solutions to manufacturing problems in high-strength sheet metals or complex parts for lightweighting solutions and high-performance requirements," says Begoña Casas, FormPlanet technical coordinator at Eurecat.

Furthermore, by shortening both the R&D and industrialisation stages, the platform's testing methodologies also help reduce the time it takes to bring new lightweight materials to market. In addition, the new methods reduce testing time, complexity, and the number of specimens required, resulting in significantly more cost-effective characterisation methods.

A one-stop shop for sheet metal characterisation

According to Daniel Casellas, scientific director at Eurecat, the FormPlanet platform will help manufacturers predict part performance and ensure a zero-defect production process. "Our test bed offers the most innovative sheet metal characterisation, modelling, and quality testing services available in Europe," explains Casellas. "For the sheet metal forming industries, this tool is nothing short of a game changer."

FormPlanet and its innovative methods will soon be made available to the European sheet metal forming industry via an independent entity. Eurecat, along with its partners [Letomec](#) and [COMTES FHT](#), are currently in the process of establishing the entity, which they hope to launch by early 2023.

"Through this new entity, we will be able to offer a one-stop shop for sheet metal characterisation, modelling and quality control, along with such complementary services as technical and business consulting," adds Casas.

In parallel to launching the new entity, the project team continues to improve and demonstrate the innovative

characterisation and modelling services already available via the FormPlanet platform.

Note: This article was last updated in June 2022.

PROJECT

FormPlanet – Sheet metal forming testing hub

COORDINATED BY

Eurecat Foundation in Spain

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814517

PROJECT WEBSITE

formplanet.eu



A tribology test bed to lubricate European innovation

A new test bed offering a range of tribo-analytic services aims to reduce the time and costs involved in developing innovative new materials.

Tribology is the science of how surfaces interact in relative motion, and involves the study of friction, wear and lubrication. It is essential for the design of components such as [bearings, gears and clutches](#).

“Efficiency, durability and innovation are all key factors that must be kept in mind when developing a new product,” explains Franz Pirker, responsible for business development at [AC2T research](#), the Austrian Excellence Center for Tribology in

Wiener Neustadt. “This often starts with knowing which material works best and what lubricant can best meet your product’s efficiency and durability requirements.”

This typically involves long development processes, substantial prototyping costs, and rigid workflows. “We looked at the current situation and thought, ‘there has to be an easier way to get answers to our tribology-related questions’,” adds Pirker.



Now there is. It's called [i-TRIBOMAT](#) (Intelligent Open Test Bed for Materials Tribological Characterisation Services), and it was developed with the support of EU funding. i-TRIBOMAT is a one-stop shop for the tribological characterisation of advanced materials.

"Offering such on-demand services as standardised tribological characterisation, data-driven insights, and virtual work rooms with integrated lab-to-field upscaling, i-TRIBOMAT ensures you can develop your products more efficiently and at lower costs," says Pirker, who serves as the project's coordinator.

Simulating material behaviour at the component level

i-TRIBOMAT is unique in that it is the world's first user-driven Open Innovation Test Bed dedicated solely to validating and upscaling new materials. "By enabling the intelligent characterisation of tribological materials, this platform will play a key role in fostering innovation," remarks Pirker. "In other words, it is a game changer for the European manufacturing industry."

The i-TRIBOMAT platform includes a portfolio of features and services. "It all starts with having access to a tribological infrastructure of more than 100 tribometers and characterisation equipment, including the latest protocols, procedures and tribo-analytics," notes Pirker.

The platform also offers such data-driven capabilities as cloud storage and sharing, data mining, big data analytics, an integrated tribological materials database, and fast report generation, all hosted on a secure server.

According to Pirker, one of the most popular features is a web-based collaboration interface. "This is a virtual workroom equipped with tribo-models and designed to facilitate collaboration and the simulation of material behaviour at the component level," he says.

Reducing time and costs involved in materials development

i-TRIBOMAT's research partners are regularly developing and adding new services to the platform, which will soon be made available via a spin-off entity called i-TRIBOMAT: The European Tribology Centre. "A joint venture of the various research partners, establishing this company ensures the sustainability and longevity of the platform," explains Pirker.

In preparation for the spin-off's launch, the research team held an open call for early adopters, offering companies the chance to test i-TRIBOMAT's developed services. "Eighteen companies replied to the call, showing just how much demand there is for reducing the time and costs involved in materials development," concludes Pirker.



i-TRIBOMAT ensures you can develop your products more efficiently and at lower costs.

Note: This article was last updated in June 2022.

PROJECT

i-TRIBOMAT – Intelligent Open Test Bed for Materials Tribological Characterisation Services

COORDINATED BY

AC2T research in Austria

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814494

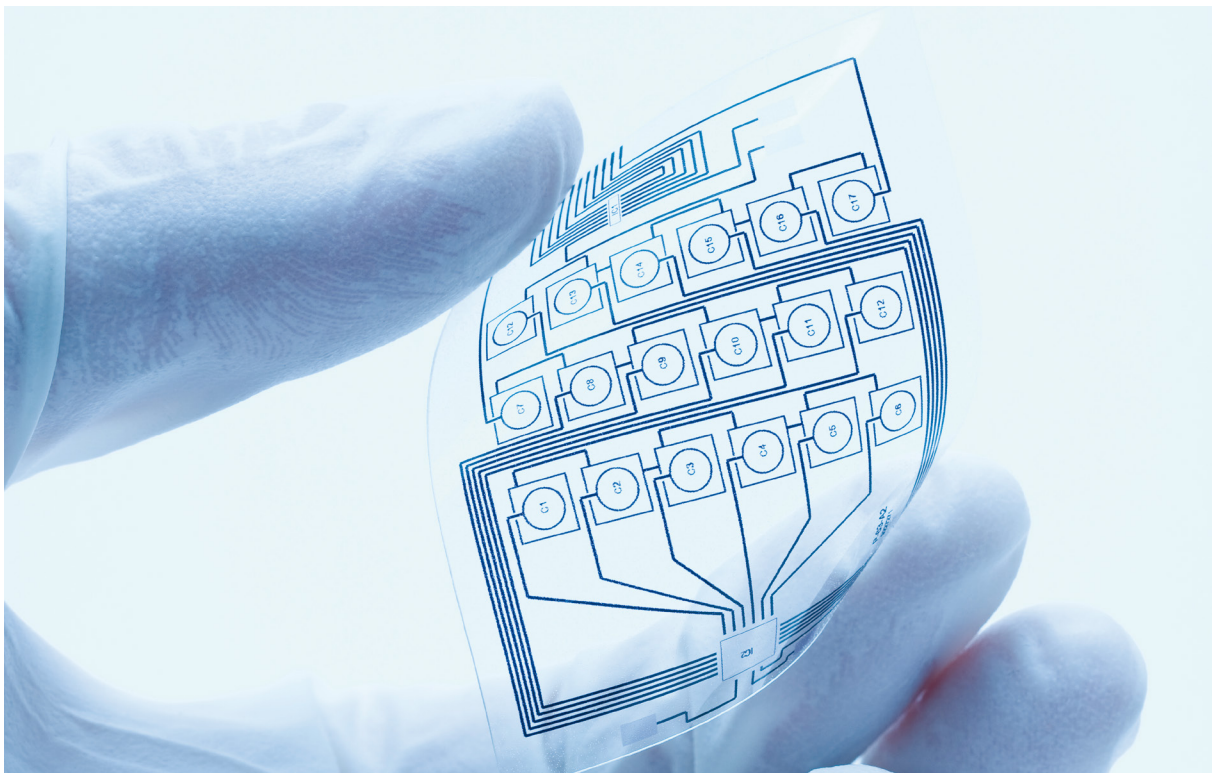
PROJECT WEBSITE

i-tribomat.eu



Lowering the barrier for innovation in flexible electronic components

LEE-BED has developed an Open Innovation Test Bed offering non-technical services, pilot lines and procedures for digital production technologies.



The digitalisation of the manufacturing industry, known as Industry 4.0, is held back in Europe by the high cost and limited capacity of technologies such as 3D printing and laser processing.

To competitively develop and manufacture embedded components such as [flexible circuit boards](#), Europe must increase production capacity of the prerequisite functional nanomaterials.

Achieving this relies on the digitalisation of supply chains, to lower manual labour costs, while also speeding up the

development process using advanced machine learning and artificial intelligence techniques.

To meet the challenges of this digitalisation, the EU-supported project [LEE-BED](#) (Innovation test bed for development and production of nanomaterials for lightweight embedded electronics) has developed an Open Innovation Test Bed, designed as a one-stop shop catering to the whole supply chain.

"Our demonstrations have created many exciting novel solutions, which will help us sell the LEE-BED services and pilot lines," says project coordinator Zachary Davis from the [Danish Technological Institute](#) in Taastrup, the project host.

It has been validated across four industrial case studies so far. One opportunity currently being explored with [Swarovski](#) will pave the way for a larger collaboration between Swarovski and the automotive industry, delivering next-generation interior electronic panelling.

Patenting assistance, business planning and standardisation services

Customers of LEE-BED's open test bed can access the system through a [single entry point webpage](#), which splits their user journey into three phases.

The first provides technological and economic assessment, using information about a client's operation to offer insights about the feasibility of new ideas.

Building on these findings, the second phase gives access to pilot line technologies, covering: the development and upscaling of tailored nanomaterials; the development and production of nano inks, adhesives and composites; and prototyping and piloting of printed and embedded electronic circuits and sensors. These aim to provide a development time of under six months.

The third phase concentrates on knowledge transfer, providing clients with tools for commercialising their products. This includes intellectual property rights and patenting assistance, business planning and standardisation services.

As well as developing prototypes of flexible transparent lighting and touch panels for Swarovski, case studies include: embedding flexible electronics into plastic panelling for automotive developer [MAIER](#); solutions for embedding asset tracking and temperature sensing into composite structures for construction company [ACCIONA](#); and embedded temperature and humidity sensors for smart packaging applications for [Grafietic](#) (website in Spanish).

"These cases allowed us to provide a range of prototypes and demonstrations," adds Davis. "For example, we developed silver nanowires, formulated into a printable ink, alongside a process to create [highly transparent electrical circuits](#) with LED and touch sensor functionalities."

The project also developed more bespoke services, such as providing information about funding options for SMEs lacking

the capital for pilot projects, as well as proposal coordination and writing services.

A greener embedded and printed electronics industry

Currently, LEE-BED's services can be accessed freely while the team is further validating LEE-BED's overall procedures, through an additional 10 end user case studies and continuing to develop new technologies and pilot lines. In response to increased demand, they are furthering work on 3D electronics printing.

"Thanks to an open call, we've had interest from several companies, which we believe will lead to paying projects, especially linked to our transparent panelling and interactive lighting and textile-embedded electronics," remarks Davis. "We aim to have several revenue-generating pilots finished by the project's end."

They also remain vigilant for more sustainable materials and recycling processes to make their own operations, as well as the entire embedded and printed electronics industry, greener and more self-sufficient.

Note: This article was last updated in June 2022.



We developed silver nanowires, formulated into a printable ink, alongside a process to create highly transparent electrical circuits.

PROJECT

LEE-BED – Innovation test bed for development and production of nanomaterials for lightweight embedded electronics

COORDINATED BY

Danish Technological Institute in Denmark

FUNDED UNDER

Horizon 2020-LEIT-NANO and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814485

PROJECT WEBSITE

lee-bed.eu

Open Innovation Test Bed for lightweight components

Industry increasingly relies on novel materials – saving time, effort and money, while benefitting the environment. Targeting SMEs particularly, LightCoce has created a one-stop shop Open Innovation Test Bed, for the development of concrete and ceramic lightweight components.

Lightweight components which are easy to transport, handle and install, are increasingly used in the construction and infrastructure industries, as well as for aerospace, automotive and defence projects.

Lightweight properties are typically achieved through the use of special additives and/or aggregates. But while the resulting components deliver reduced environmental footprints and do bring down overall costs, the materials themselves are more expensive than traditional ones.

“To make these materials more attractive and competitive, they have to not only match the properties of traditional materials but surpass them, with functionalities like enhanced

strength or self-cleaning,” says Maria Taxiarchou from the [National Technical University of Athens](#), coordinator of the EU-supported [LightCoce project](#).

LightCoce has developed an [innovation test bed](#) – a platform providing open access to facilities, expertise and services needed to develop, test and upscale advanced materials for industry.

LightCoce's single entry point (SEP) covers the whole value chain, providing tailor-made services for the development and upscaling of novel lightweight and multifunctional concrete, alongside conventional and advanced ceramics. The SEP is supported by 17 specialised service providers.



"This one-stop shop is targeted especially at small and medium-sized enterprises lacking the necessary resources for research and development. Our SEP minimises the costs and risks of innovation," says Ioannis Paspaliaris, managing director of LightCoce.

The SEP has already been validated and optimised through test cases with the project's industrial partners and clients that accessed the services after responding to an open call.

Bridging the gap between lab and industry

LightCoce SEP's five pilot lines offer a range of testing and upscaling services covering [three thematic areas corresponding to different materials](#).

Firstly, pilot lines for concrete provided by the National Technical University of Athens and the [Research Institutes of Sweden](#). Secondly, for traditional ceramics provided by the [Ceramic Industry Research Association](#) and the [Nuremberg Institute of Technology](#). Lastly, a pilot line for advanced ceramics provided by the [Łukasiewicz Research Network – Metal Forming Institute](#).

"As not all successful lab products translate to industrial scale, companies can use our SEP to cost-effectively investigate upscaling potential, while identifying scaling problems and fine-tuning material formulations and synthesis processes, for increased production," explains Paspaliaris.

Case studies have already been completed with industrial partners and included the development of nano-enabled lightweight concrete; nano-modified cellular lightweight concrete; load bearing, lightweight sandwich concrete

panels; multifunctional lightweight bridge decks; lightweight porcelain tiles for improving air quality; extruded lightweight bricks; lightweight high-durability valves for satellites; and lightweight re-entry vehicle parts for aerospace.

"All these cases have been successfully completed at pilot scale, meeting our clients' requirements, in terms of properties and characteristics. We are now working on them at demonstration scale," adds Taxiarchou.

The LightCoce business ecosystem also offers services to support the commercialisation of materials, such as characterisation, process modelling, quality assurance and monitoring, life cycle analysis, standardisation, safety, marketing and innovation management.

Driving innovation

LightCoce contributes directly to the [European Commission's strategy](#) to make access to state-of-the-art technology infrastructure and expertise easier, accelerating innovation and entry to emerging markets.

Introducing novel, lightweight and multifunctional construction materials into the market also offers significant energy savings, benefiting consumers and the environment.

While interest has already been expressed by several construction industry companies, for now the team are fine-tuning their operation based on feedback from the new test cases resulting from their recent open call.

Note: This article was last updated in June 2022.



All these cases have been successfully completed at pilot scale, meeting our clients' requirements.

PROJECT

LightCoce – Building an Ecosystem for the up-scaling of lightweight multi-functional concrete and ceramic materials and structures

COORDINATED BY

National Technical University of Athens in Greece

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814632

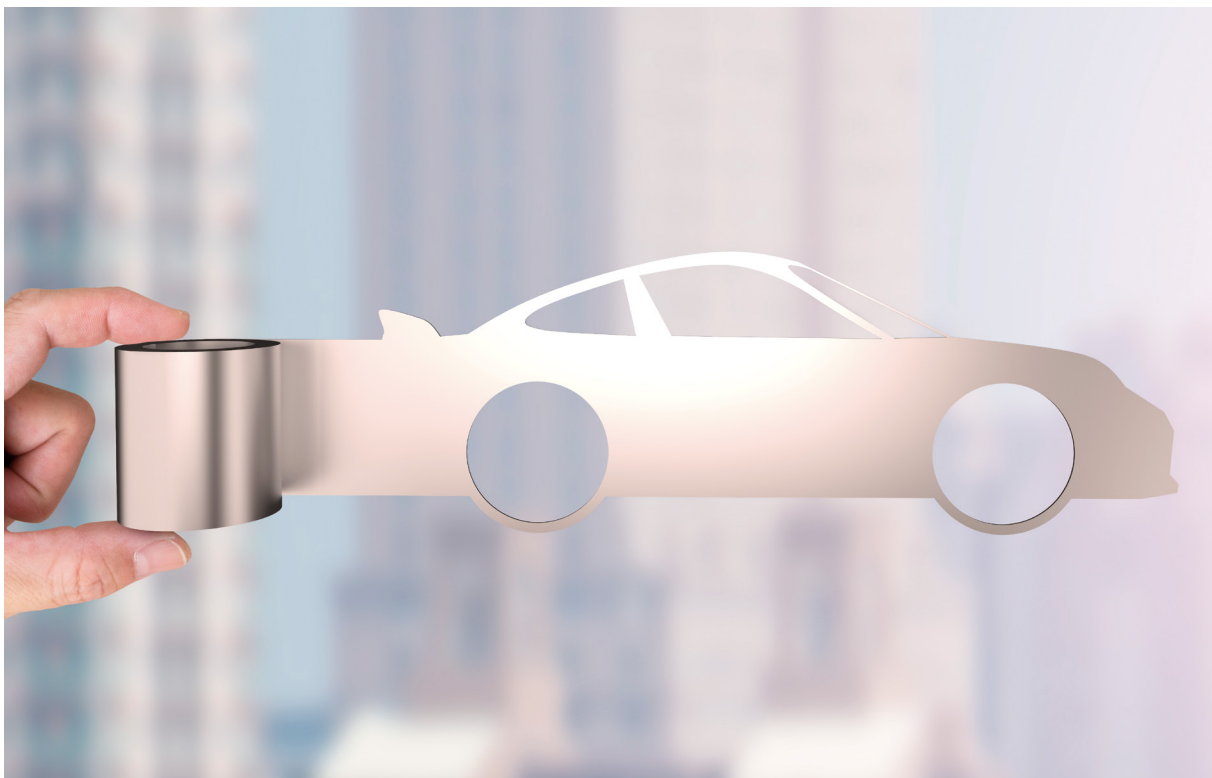
PROJECT WEBSITE

lightcoce-oitb.eu



Bringing advanced lightweight metals to the market

Despite decades of scientific research into advanced lightweight metal alloys, only a limited number of products have reached the market. A new open innovation ecosystem aims to shorten this pathway.



Lightweight metal alloy composites are increasingly critical for components in the automotive, [aerospace](#) and manufacturing industries. These materials have high strength-to-weight ratios and low density, meaning vehicles are lighter, consume less fuel and therefore produce lower levels of harmful emissions.

With the advent of nanomaterials offering superior properties, a new class of nanocomposites is being developed and will be able to overcome technical limitations of pure metals.

Despite many research projects focusing on these advanced materials over the past few decades, there have been only a limited number of products that have made it to the market.

Limited funding for development and upscaling has hampered their progress, and there has been reluctance among end users to accept non-standardised technologies. The industry has been faced with a phenomenon known as the 'valley of death', where these promising materials never reach their full potential.

To overcome these barriers, the EU-funded [LightMe](#) (An Open Innovation Ecosystem for upscaling production processes of lightweight metal alloys composites) project developed an open innovation ecosystem designed to upscale industrial processes for lightweight metals. LightMe aimed to be a point of reference for innovation in lightweight metal matrix nanocomposites (MMnCs) – alloys reinforced with high-strength particles.

For example, one test case with manufacturing [Hidria](#) sought to produce lightweight steering pinions – a part that allows the wheels to turn side to side – using aluminium MMnCs. LightMe partners [Brunel University London](#) and the [Austrian Foundry Research Institute](#) produced prototype products, showing that the manufacturing technology could bring significant benefits to the European automotive industry.

Building an innovative ecosystem

LightMe comprised 25 partners from 15 European Member States, all bringing knowledge and expertise to help boost innovation and development for lightweight metals. The LightMe consortium was represented by a non-profit organisation through which new clients can access the entire value chain.

LightMe was designed not only to help with the development and upscaling of metal technologies, but also to provide clients with everything they need to speed up the process to the market. This includes modelling and simulation services, testing and monitoring, as well as advice on regulatory compliance, nanosafety and business plan development.

The system was designed to function as a bridge between upstream members of the value chain, such as material developers and research institutions, and the downstream end users and industrial manufacturers.

Pilot lines and test cases

The LightMe project created [six pilot lines](#) with advanced manufacturing services accessible across Europe. These included low pressure die casting, high pressure die casting, green sand casting, metal wire additive manufacturing, metal additive manufacturing and sintering extrusion.

LightMe ran several test cases using these pilot lines to develop new material technologies and generate feedback to improve the services offered.

Dissemination of results

The project led to the publication of three peer-reviewed articles in scientific journals, including on the further development of [advanced techniques](#) for the production of [metal matrix composites](#).

The LightMe team also organised the first [international conference on lightweight materials](#), held in May 2023.

The two-day conference gathered technical presentations in the field of lightweight materials, with submissions from academia and industry professionals.

PROJECT

LightMe – An Open Innovation Ecosystem for upscaling production processes of lightweight metal alloys composites

COORDINATED BY

Polytechnic University of Milan in Italy

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814552

PROJECT WEBSITE

lightme-ecosystem.eu



Advancing innovation in medical technologies

Medical devices must follow strict testing procedures to secure regulatory approval. This new innovation network aims to speed up the process.

Medical technology (MedTech) is a thriving industry in Europe. SMEs in this sector provide over 650 000 jobs and create a trade surplus of over EUR 14 billion.

Achieving regulatory approval for new [medical devices](#) can be a complex and lengthy process, requiring rigorous clinical testing. In 2021, the European Union's [Medical Devices Regulation](#) (MDR) entered into force, replacing the Medical Devices Directive, requiring further documentation and testing for both new and legacy medical devices. While improving safety and regulatory alignment, the new rules have increased the time and costs necessary to bring new devices to market, resulting in the unintended consequence of SMEs addressing other global markets before Europe.

"Overall, the MedTech SME industry in Europe is struggling with the transition to the new Medical Devices Regulation with its increased requirements in documentation and testing, as well as with the consequences from the COVID-19 pandemic," explains [Ulrich Friepp](#), deputy division director of Translational Biomedical Engineering at the [Fraunhofer Institute for Toxicology and Experimental Medicine](#) and [MDOT](#) (Medical Device Obligations Taskforce) project coordinator.

In the EU-funded MDOT project, researchers created a new open innovation network and data platform to support Europe's SMEs in acquiring regulatory approval for new products. MDOT was set up to help speed up SMEs' compliance with the new regulations, while enhancing the quality of medical devices.



"In a nutshell, the goal of MDOT is to upgrade test bed facilities and enable knowledge of regulatory requirements, and to develop suitable test methods to prevent loss of innovation and economic strength of MedTech in Europe," Froriep adds.

A focal point for medical regulation

MDOT offers a single entry point for MedTech companies aiming to bring new devices to market, especially in the fields of inhalation and implants. Through the MDOT platform, businesses have access to a network of specialised partners and research institutes across Europe, clinical evaluation experts, test bed facilities and regulatory advice to help them through the entire process. "We address the MedTech value chain from all relevant angles," says Froriep.



In a nutshell, the goal of MDOT is to prevent loss of innovation and economic strength of MedTech in Europe.

For example, in the field of inhalative drug delivery, some MDOT partners are working to develop new devices specifically targeting [preterm babies](#). This can enable a much more precise and efficient treatment for one of the most vulnerable patient groups, while at the same time reducing the waste of drugs.

A new technology developed by one MDOT partner was tested with a co-developed test stand with a second partner, while clinical testing will take place with a third partner, all accompanied by regulatory advice. Thanks to the success of the process, the MDOT team is considering creating a start-up company to commercialise the technology.

Creating a medical support network

The MDOT project also developed a data platform to generate and locate medical data, including extensive libraries of material properties, relevant medical literature, and regulatory affairs knowledge from Europe and around the world. This resource will continue to be expanded and used by companies hoping to secure regulatory approval for their products.

"One of the biggest challenges in the Open Innovation Test Bed initiative is finding a way to become sustainable beyond the project and forming a single entry point," remarks Froriep. "After many iterations, including very different models and external input, we have finally found a way that can work."

PROJECT

MDOT – Medical Device Obligations Taskforce

COORDINATED BY

Fraunhofer Society for the Advancement of Applied Research in Germany

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814654

PROJECT WEBSITE

mdot.eu



Improving access to nanotech to deliver innovative green materials

Tapping the potential of nano-enabled lightweight composite materials remains a challenge, especially for SMEs. By facilitating access to cutting-edge production lines, the OASIS project has led to the development of a number of promising innovations.



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The global drive to cut CO₂ emissions demands that certain sectors, including transport, energy and construction, take actions that reduce their carbon footprint. These actions include replacing

heavy, energy-inefficient materials used in the construction of infrastructure and manufacturing of vehicles with lighter metals and polymer composites.

Cars made from lighter materials will be more energy-efficient, and [building materials that integrate polymer composites](#) will facilitate faster construction, reducing transport costs and achieving better overall energy efficiency.

A key challenge however is ensuring that these new materials deliver the mechanical, electrical and thermal performances required. This often means having to combine several materials together to meet industry needs, and the cost of making these polymer composites can be prohibitive.

Bringing innovative nanotechnologies to market

This was the starting point for the [OASIS](#) project. “We thought that the introduction of nanotechnologies into metallic and polymer composites could be the answer to this challenge,” explains OASIS (Open Access Single entry point for scale-up of Innovative Smart lightweight composite materials and components) project coordinator Sonia Florez from [Tecnalia](#) in Spain.

The use of nanotechnologies in composite materials can make them multifunctional, lightweight and robust, and can offer a range of additional benefits such as improved mechanical performance, heating abilities, anti-icing capabilities and fire resistance.

“However, we found that there was a lack of nano-enabled product manufacturing facilities in Europe with suitable quality control and product traceability for industrial-scale production,” continues Florez.

“In addition, investment costs in such manufacturing facilities are often considered to be too high.”

To address this, the OASIS project sought to provide industries – and especially SMEs – with access to cutting-edge nanotechnology facilities, to encourage innovation and bring nanotechnology-based solutions to market. Existing manufacturing facilities were upgraded by increasing production rates and implementing greater quality control.

In total, 12 upgraded pilot lines were made accessible to businesses through an open call. Successful applicants received free access to this ecosystem.

“We also found that the uptake of nanotechnologies was being held back by a lack of specialised expertise,” adds Florez. “So technological and business support services were provided, to really help drive the commercialisation of new lightweight, multifunctional products based on aluminium and polymer composites.”

Technological and business support services for nanotech

While access to advanced manufacturing facilities remains critical to accelerating European innovation, the OASIS project has demonstrated how certain bottlenecks can be overcome.

“The uniqueness of the OASIS innovation test bed lies in the fact that it brought together complementary technologies and services from multiple organisations across Europe,” says Florez. “This enabled the development of innovative products, which would not have been possible by interacting with individual service providers separately.”

Project partners succeeded in developing six showcase products, benefiting from access to 12 pilot lines and the associated project technological and business support services. These innovations included nano-enabled pultrusion – a manufacturing process that turns fibres and liquid resin into a fibre-reinforced plastic – for strong, lightweight construction materials.

A mass production process for nano-reinforced aluminium components for electric vehicles was also developed, along with a system to efficiently repair defects in composite structures on aircraft. These solutions underlined the effectiveness of the test bed in responding to industry needs, as well as the potential of nanotechnology in delivering cutting-edge products.



There was a lack of nano-enabled product manufacturing facilities in Europe with suitable quality control and product traceability.

The open call to external businesses led to 11 projects being selected. “Promising results from these ‘democases’ include the introduction of nanoparticles in coatings to protect concrete against aggressive environments and lightweight aircraft battery casings,” says Florez. “Nanoparticles were also applied to increase the durability of hydrokinetic machines that produce green electricity. This had a positive impact on maintenance and replacement frequency, leading to even greener energy.”

Through facilitating access to high-quality nano-enabled materials production, the OASIS ecosystem will continue to provide a significant boost to European competitiveness.

The Open Innovation Test Bed has made a technical marketplace catalogue of products and business support services available on the OASIS project website, along with a catalogue of ecosystem organisations, helping to kick-start European excellence in this sector.

Note: This article was last updated in June 2022.

PROJECT

OASIS – Open Access Single entry point for scale-up of Innovative Smart lightweight composite materials and components

COORDINATED BY

Tecnalia in Spain

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814581

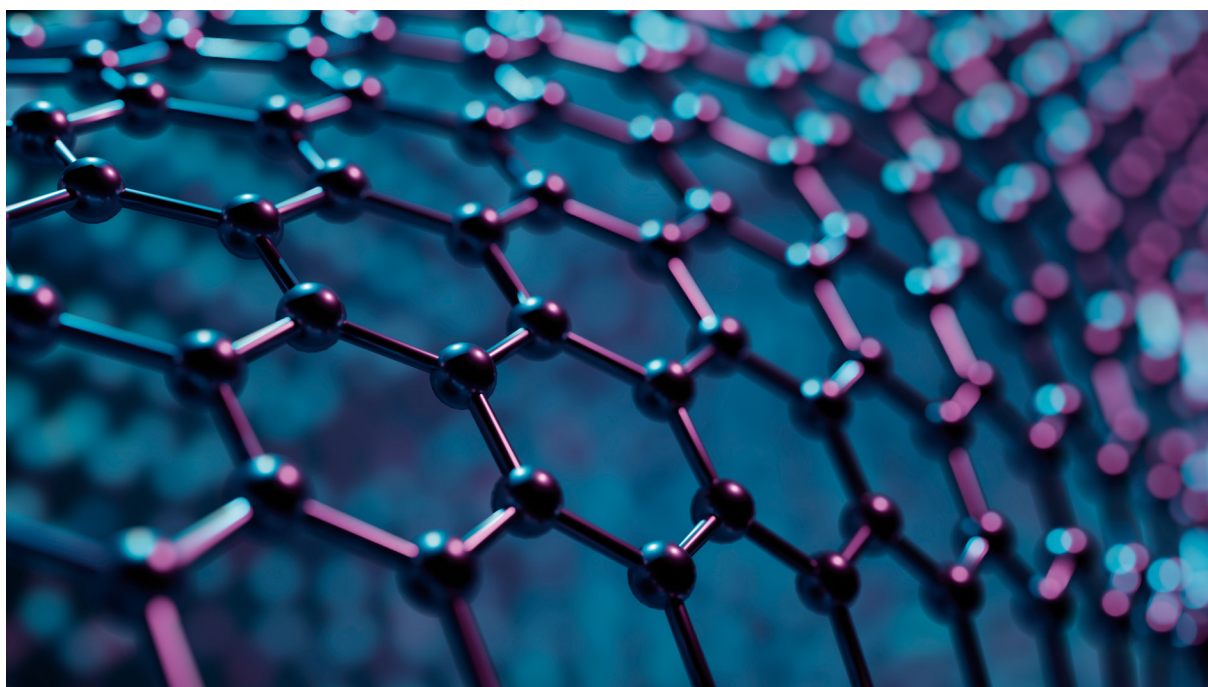
PROJECT WEBSITE

project-oasis.eu



Giving nanotechnology-enabled medical devices a boost to market

Ultrasmall materials could have big impacts in most fields of medicine, though achieving regulatory approval and market access is challenging. A new dedicated open access innovation platform offers businesses a helping hand.



Manipulating materials on a near-atomic level gives them new properties, creating unique opportunities in medical applications. In this way, [nanotechnology](#) holds the potential for advances in cancer research, regenerative medicine, neurology, dentistry and more.

However, these novel properties and behaviours also present fresh challenges regarding their characterisation, preclinical testing, safety profiles, regulatory evaluation and market access. In many cases, the usual standards are not fully applicable to nanomaterials. Nano-enabled medical technologies (MedTech)

must be carefully scrutinised, as they are complex products with technologies often still under development.

The EU-funded project [SAFE-N-MEDTECH](#) (Safety testing in the life cycle of nanotechnology-enabled medical technologies for health) aims to speed up innovation, regulation and market access/reimbursement in this promising sector. The project developed an open access innovation platform to provide a one-stop shop to assess the qualification, regulation, biocompatibility and specific properties of nanomaterials and validation in medical settings.

"The main aim of SAFE-N-MEDTECH was to develop an Open Innovation Test Bed in order to support developers of nanotechnology-enabled medical technologies in their transition from clinics to the market," says [Iñaki Gutiérrez-Ibarluzea](#), director of innovation at the [Basque Foundation for Health Innovation and Research](#) (website in Spanish and Basque) and SAFE-N-MEDTECH project coordinator.

Open access platform for nanotech

The SAFE-N-MEDTECH project built an Open Innovation Test Bed combining the capabilities, knowledge and services necessary to develop nano-enabled medical devices. This includes applications and know-how specific to nanomaterials, including electromagnetic properties and electrical compatibility.

"In our case we aim to cluster, test and offer all these capabilities through a single entry point, together with a coherent, regulatory and technology assessment-driven development strategy," adds Gutiérrez-Ibarluzea.

The platform offers a range of services, including discussions on the feasibility of an idea with key stakeholders, expertise in regulation, market access, and information on reimbursement specialists. It also includes a 'decision support system' that assists clients in finding the right services tailored to their needs and the technical characteristics of their technology.

"Apart from the aforementioned services we include regulatory support, health technology assessment advice, laboratory testing including cytotoxicity, proof of concept in clinical settings – and depending on the demand and availability, clinical validation and support in clinical trials," notes Gutiérrez-Ibarluzea.

A combined effort to produce a cooperative framework

The most important result from the project was the overall cooperative framework created over more than four years between the 28 project partners.

The SAFE-N-MEDTECH consortium also created a business entity aiming to be the single entry point (SEP) for future commercial

development of nano-enabled MedTech in Europe, which is currently entering a pilot test phase.

"Moreover, we have contributed to a better implementation of regulatory science, early advice and early dialogue processes that, together with specific clinical evaluation tools, allow for guiding the developers towards the optimal indication for their products and the right development pathway," notes Gutiérrez-Ibarluzea.

So far, SAFE-N-MEDTECH has supported eight products in their pathway towards commercialisation, seven of which are being developed by different types of companies – from academy spin-offs and SMEs to large multinational industries.

"The main objective was to create a sustainable organisation with a credible business plan that can first of all provide services to innovators considering the design and production of nano-enabled MedTech," says Gutiérrez-Ibarluzea. "Without the EU funding this would not have been doable."



The main aim of SAFE-N-MEDTECH was to support developers of nanotechnology-enabled medical technologies in their transition from clinics to the market.

PROJECT

SAFE-N-MEDTECH – Safety testing in the life cycle of nanotechnology-enabled medical technologies for health

COORDINATED BY

Basque Government Department of Health in Spain

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814607

PROJECT WEBSITE

safenmt.com

A test bed for high-risk medical devices

A new open innovation testing network developed by the EU-funded TBMED project aims to increase patient access to high-risk medical devices, while improving their quality.



The medical technology (MedTech) sector is highly competitive, and SMEs developing high-risk medical devices are facing increasing regulatory hurdles.

To keep European SMEs at the forefront of the global MedTech innovation race, the EU-funded project [TBMED](#) (A testing bed for the development of high-risk medical devices) aims to reduce the time taken from idea to market in this sector through the creation of an Open Innovation Test Bed, named go.Med.

“go.Med will bring together a technical multidisciplinary team, outstanding facilities and consulting specialists covering the whole value chain from lab to clinical trials to develop cost-effective and safe next-generation medical devices to hasten the uptake in the highly regulated European market,” explains [Iraida Loinaz](#), director of the [CIDETEC](#) Institute for Nanomedicine and TBMED project coordinator.

Ultimately, this will ensure and improve the quality of life of patients by easing their access to next-generation medical devices.

Developing a hybrid innovation support network

The [go.Med platform](#) will be a physical test bed of connected laboratories supported by an online platform developed to facilitate interactions between customers, service providers and go.Med members.

The go.Med test bed offers all the technical services required to go from proof of concept in the lab to clinical trials, including design and manufacturing optimisation, quality control, design of the scaling-up process, and monitoring of safety and efficacy in laboratory *in vitro* testing. The platform also provides support services such as regulatory strategy, health technology assessment (HTA), business advice and assistance in sourcing funding.

"All these services are united under our methodology, which allows us to minimise risks by identifying critical points in an early stage of development," Loinaz remarks.

Positive feedback from early users

The go.Med test bed is currently operating, though still not at commercial level yet. The team has worked with three use cases from the project, and also issued two open calls, resulting in four new clients.



go.Med will bring together a technical multidisciplinary team, outstanding facilities and consulting specialists covering the whole value chain from lab to clinical trials.

"One of these has just finalised their clinical trials successfully, so we are very proud to have helped them to advance in their development and be one step closer to the market," says Loinaz. "In general, I think users are quite happy with the service and think that we have helped them greatly."

Initial test cases involving [AJL Ophthalmic](#), [Cyber Surgery](#)

and the [University of Zaragoza](#) all provided positive reviews, stating that their development process became easier, cheaper and faster.

"Thanks to go.Med and the quality by design approach, our product development process was much smoother," notes [Raluca Fratila](#), senior researcher at the University of Zaragoza. "Discussing possible indications with clinicians first-hand was essential," she adds.

Creating a cooperative legacy

Loinaz says she is most proud of the fact that different entities such as universities, technology centres, healthcare systems and private companies can work together in a unified way to offer a service to SMEs and help them further develop their products.

"At the end of TBMED, technically challenging case studies are closer to the market due to this multidisciplinary approach that has involved experts in chemistry, biology, statistical analysis, medicine, and animal models," she adds.

The TBMED team is now finalising their sustainability plan and are in conversations with other test beds to check for possibilities of joining forces to become a stronger OITB. "We hope to be live in no time," Loinaz says.

PROJECT

TBMED – A testing bed for the development of high-risk medical devices

COORDINATED BY

CIDETEC Foundation in Spain

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814439

PROJECT WEBSITE

tbmed.eu



Supercharging the next generation of battery innovation

Accessing cutting-edge technological support will enable Europe's battery sector to meet industry demand for enhanced performance and greater energy efficiencies.



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While most vehicle batteries in circulation today are still based on lead-acid technology – first developed back in 1859 – lithium-ion (Li-ion) batteries are becoming increasingly popular. Key benefits include higher energy density, increased voltage capacity and longer life.

“The market for Li-ion is growing at an incredible 25 % a year,” notes TEESMAT (Open Innovation Test Bed for Electrochemical Energy Storage Materials) project coordinator Fabien Perdu from the [French Alternative Energies and Atomic Energy Commission](#). “An industrial revolution is going on. Li-ion batteries are typically used in consumer electronics, but they are also becoming a key driver in electric mobility.”

Other energy-efficient battery innovations based on different chemistries are emerging, including [redox flow batteries](#), various zinc chemistries and hybrid supercapacitors. “There is also a lot of ongoing development in potential future technologies such as lithium metal or silicon anodes, lithium sulphur and organic batteries,” adds Perdu.

Development of a competitive European battery industry

However, delivering this innovation is challenging. “Battery development involves a delicate trade-off between various criteria,” explains Perdu. “These criteria, such as energy density, storage capacity, fast charging and safety, are easy to optimise individually, but can be difficult to combine. Behind these criteria are dozens of chemical reactions and physical effects that have to be understood, mastered or circumvented.”

Understanding these processes is therefore critical to the development of a competitive and forward-looking European battery industry. The difficulty is that such

expertise is not always easily accessible, creating a bottleneck early in the development of new battery innovations.

The EU-funded TEESMAT project sought to address this by providing easy access to such knowledge and techniques, and by building up expertise through the sharing of best practices and results. This was achieved by bringing together those offering cutting-edge characterisation techniques and expertise with industrial players in the battery field.

“We set up, tested and launched this Open Innovation Test Bed to give service users access to all service providers via a single entry point,” explains Perdu. “Service users can be thought of as future customers, who are able to use this platform to contact experts with their samples and unanswered questions.”

The platform is carefully structured to help manufacturers identify the best combination of techniques that might answer each individual problem. Samples can then be dispatched to the relevant service providers, and together, conclusions can be drawn from the results. Where confidentiality allows, a database gathers information on tested samples, results and conclusions, to ensure that best practices can be shared.

“We have managed more than 700 samples and conducted 250 tests for more than 40 user cases to date,” says Perdu. “In all these cases, the platform was able to achieve results that would not have been possible without combining complementary techniques.”

Safer, longer-lasting, greener batteries

Key successes include the development of: a suitable quality control tool for the efficient development of electrodes; hybrid technology batteries with faster charging and longer life cycles; and a solution to address copper oxidation in energy storage applications. The platform has also been successful in identifying and trialling a mechanism to predict the lifespan of automotive Li-ion cells.

“We have been able to attract external service providers, which has helped to enlarge our portfolio of expertise,” adds Perdu. “Attracting more service users will help to broaden our base of future customers, and bring valuable feedback about the TEESMAT platform.”



Attracting more service users will help to broaden our base of future customers, and bring valuable feedback about the TEESMAT platform.

Next steps include preparing for the commercial phase. "After project completion in August 2022, the platform will continue to operate as a paid service," explains Perdu. "We are therefore focused at the moment on governance and operational issues, and on the precise list of characterisation techniques to be proposed."

TEESMAT will therefore continue to play a critical role in the development of a competitive and technologically cutting-edge European battery sector. "Our Open Innovation Test Bed has really opened up expertise around multiple characterisation techniques, and made this available to the battery industry," Perdu says. "In this way, we hope to have contributed towards better, safer, longer-lasting, cheaper and greener batteries."

Note: This article was last updated in June 2022.

PROJECT

TEESMAT – Open Innovation Test Bed for Electrochemical Energy Storage Materials

COORDINATED BY

Alternative Energies and Atomic Energy Commission in France

FUNDED UNDER

Horizon 2020-LEIT-NANO
and Horizon 2020-LEIT-ADVMAT

CORDIS FACTSHEET

cordis.europa.eu/project/id/814106

PROJECT WEBSITE

teesmat.eu



Advancing composite materials manufacturing in Europe

The field of new smart lightweight nano-enabled materials has made remarkable progress in recent years. The Open Innovation Test Beds Innovation Action aims to scale up and enable industry and users to develop, test and adopt new lightweight, high-performance, multifunctional and environmentally friendly materials for high-value composite components and structures.

In addition to the projects highlighted in this Results Pack, the Innovation Action includes the following:

BIOMAC: European sustainable biobased nanomaterials community – biomac-oitb.eu

BIOMAT: An Open Innovation Test Bed for nano-enabled bio-based PUR foams and composites – biomat-testbed.eu

BIONANOPOLYS: Open Innovation Test Bed for developing safe nano-enabled bio-based materials and polymer bionanocomposites for multifunctional and new advanced applications – bionanopolys.eu

Convert2Green: Converting Facilities Network for accelerating uptake of climate neutral materials in innovative products – bit.ly/Convert2Green

Exploit4InnoMat: An Open Innovation Ecosystem for exploitation of materials for building envelopes towards zero energy buildings – bit.ly/Exploit4InnoMat

FlexFunction2Sustain: Open Innovation Ecosystem for Sustainable Nano-functionalized Flexible Plastic and Paper Surfaces and Membranes – flexfunction2sustain.eu

iclimabuilt: Functional and advanced insulating and energy harvesting/storage materials across climate adaptive building envelopes – iclimabuilt.eu

INNOMEM: Open Innovation Test Bed for nano-enabled membranes – innomem.eu

INN-PRESSME: Open innovation ecosystem for sustainable plant-based nano-enabled biomaterials deployment for packaging, transport and consumer goods – inn-pressme.eu

METABUILDING LABS: METAclustered, SME oriented European Open Innovation Test Bed for the BUILDING envelope materials industrial sector using a harmonised and upgraded technical framework and living LABS – metabuilding-labs.eu

MEZeroE: Measuring envelope products and systems contributing to next generation of healthy Nearly Zero Energy Buildings – mezeroe.eu

MUSICODE: An experimentally-validated multi-scale materials, process and device modelling and design platform enabling non-expert access to open innovation in the organic and large area electronics industry – musicode.eu

NewSkin: Innovation eco-system to accelerate the industrial uptake of advanced surface nano-technologies – newskin-oitb.eu

NextGenMicrofluidics: Next generation test bed for upscaling of microfluidic devices based on nano-enabled surfaces and membranes – nextgenmicrofluidics.eu

OpenModel: Integrated open access materials modelling innovation platform for Europe – open-model.eu

Phoenix: Pharmaceutical Open Innovation Test Bed for Enabling Nano-pharmaceutical Innovative Products – phoenix-oitb.eu

VIPCOAT: Virtual open innovation platform for active protective coatings guided by modelling and optimization – ms.hereon.de/vipcoat



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RESULTS PACK ON ADVANCED MATERIALS

This CORDIS Results Pack showcases innovative projects working on high-performance engineered advanced materials that hold great promise for a variety of industrial fields, including medicine, electronics and energy.



Check out the Pack here:
cordis.europa.eu/article/id/443403



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