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Let's rethink plastic!

FlexFunction2Sustain – Open Innovation Test Bed launched on 1st April to boost innovations for sustainable plastic and paper products to reach the market faster.

On April 1st, the EU-funded initiative FlexFunction2Sustain was launched. The project, financed by the European Union's Horizon 2020 research and innovation programme, will support Plastics and Paper Processing Industry in overcoming environmental challenges while entering the digital age. 19 European partners unify their competencies, practical and business development expertise and technical infrastructure to provide a wide access to innovative solutions through a sustainable open innovation ecosystem. This Open Innovation Test Bed for nano-functionalized plastic and paper surfaces and membranes will support innovative SMEs and industries by drastically reducing the time-to-market for novel concepts, ideas and products.



The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 862156



Funded by the European Union

Nano-functionalisation for smart and sustainable plastic surfaces

Plastic and paper based materials are used in a wide range of daily life products. Applications represent well established multi-billion Euro markets (e.g. food and pharma packaging, furniture surfaces, membrane-based filter systems, medical products etc.). New business opportunities will arise from replacing glass and metal by nano-functionalized plastic or paper surfaces in many products. That allows the reduction in weight and cost and gains in mechanical flexibility together with additional properties. Such properties include e.g. the blocking of water and oxygen permeation, surface conductivity, antimicrobial and anti-viral properties or chemical and corrosion resistance. State-of-the-art solutions often rely on composite or multi-layer materials. Such composites, however, have a major drawback with respect to their environmental footprint: they are neither fully recyclable nor compostable/degradable. Further, most plastic products are synthesized from mineral oil instead of renewable resources.

Many innovations come from the urgent need to reduce plastic waste in the world addressing novel polymer formulations (bio-based, bio-degradable) and novel product designs. However, high access barriers to pre-commercial material development, testing and certification facilities and pilot-production capabilities in Europe prevent StartUps, SMEs and Industries from commercially exploiting novel ideas in nanotechnology and advanced materials. Investors, although willing to support innovative solutions, lack the technical knowledge and the institutional capabilities for evaluating new ideas, products and business models of StartUps.

FlexFunction2Sustain – who is behind it and how does it work?

The EU-funded initiative FlexFunction2Sustain aims at overcoming these limitations (often referred to as “Valley of Death” between research and industry) by creating an Open Innovation Test Bed (OITB) for nano-functionalisation technologies that enable sustainable and smart plastics and paper based products. The OITB will provide users an easy access to holistic innovation boosting services through a single entry point. The OITB will support its customers in material and product design, in process and product development, in product verification and certification, with pilot and small series production services and with accessing new markets and business opportunities. Integrating all these services to a complete, all-round offer will substantially reduce the time and cost to progress through the innovation chain from an idea to a successful product.

FlexFunction2Sustain uniquely interconnects renowned Universities, Applied Research Organisations, and Companies offering pilot production services with Business Development, Networking and Intellectual Property Experts to support customers in any stage of the innovation chain. The consortium was assembled to improve competitiveness of Europe in the field of nano-functionalized materials, and to increase market share of European industries in the value chain of sustainable and smart plastic and paper related products.

FlexFunction2Sustain member facilities cover all major nano-functionalisation techniques available for plastic and paper surfaces. This includes a large portfolio of techniques for atmospheric pressure and vacuum thin film coating; micro- and nano-structuring of surfaces; printed electronics processing; and lamination and product integration. Pilot-scale facilities for testing novel polymer formulations and for verifying recyclability and bio-degradability of innovative products complete the offer. Finally, application verification and pre-certification test facilities for food and non-food packaging and anti-microbial and antiviral applications will accelerate market penetration of novel products in sensitive use scenarios.

FlexFunction2Sustain will align the technical facilities according to the needs of six industrial use cases, including i.e.:

- recyclable and marine degradable food and cosmetic packaging,
- selective water filter membranes,
- innovative and smart plastic surfaces in automotive and
- bio-degradable security and fraud protection labels.

Project coordinator Dr. John Fahlteich, Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP, explains the unique potential of the ecosystem: “The strength of the FlexFunction2Sustain OITB is the unique cooperation between the research, technology and business development partners to set-up a combined offer of complementary services for boosting innovation. Customers will be able to gain access to a pan European innovation network through a single entry point without the need to speak multiple languages or to understand the law in multiple countries. This model allows the most appropriate technology selection and shaping among whole technological portfolio available in the EU. Users can expect optimum cost, time-to-market, reliability and performance.”

Holistic services from a Single Entry Point in the whole European Market

The services of the OITB will be made available to the industry through a novel “single entry point” company that will be created before Summer 2021. The company will act as general contractor for the customer managing all services and actions of the OITB for highest service quality and efficiency. Through this company, the customer will gain access to services from partners in more than 10 different EU countries in either its native language or English. The single entry point will eliminate the need to negotiate multiple service contracts in different countries and to organize material transfers and information exchange between different suppliers. Strategic partnerships with regional agents will ensure access in the whole European Market.

To accelerate the uptake of the OITB services, FlexFunction2Sustain will launch two competitive calls for up to 20 pre-commercial SME-targeted pilot cases. The first call will open in January 2022 and will invite SMEs to submit innovation project proposals to FlexFunction2Sustain. The best rated projects will receive discounted services from the OITB.

The FlexFunction2Sustain ecosystem will support innovative SMEs and industries by providing an expert support from an early development stage to the optimised transformation of prototypes into valuable and innovative products. The members of the consortium are convinced that only the complex response of this nature will provide the necessary service portfolio to create sustainable new products and business cases in the European Union.

About FlexFunction2Sustain

The project FlexFunction2Sustain has started on 1st April 2020 and will run 48 months. The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862156.

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FlexFunction2Sustain consortium consists of 19 European partners, including research organizations, universities and private companies: Fraunhofer Gesellschaft (Fraunhofer Institute FEP, IAP und IVV), JOANNEUM RESEARCH Forschungsgesellschaft mbH, Aristotle University Thessaloniki, Coatema Coating Machinery GmbH, AMCOR Group GmbH, Gesellschaft für Mittelstandsförderung mbH, Organic Electronics Technologies P.C., 24IP Law Group France Sarl., BL Nanobiomed P.C., IPC Centre Technique Industriel de la Plasturgie et des Composites, INL, Hellenic Organic and Printed Electronics Association HOPE-A, I3Membrane GmbH, HUECK FOLIEN GmbH, Centro Ricerche Fiat S.c.p.A., Procter & Gamble Service GmbH, SONAE MC – Serviços Partilhados S.A., Capri Sun GmbH, AMIRES s.r.o.

The project coordinator is the Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP, Dresden, Germany.

More information about the project can be found at www.flexfunction2sustain.eu (full version available in June 2020).



In 2015, packaging materials contributed 141 million tons to the global plastic waste generation. FlexFunction2Sustain will promote technologies and innovations to replace state-of-the-art packaging by sustainable solutions for a substantial reduction of plastic waste in the world.

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Picture in printable resolution: www.fep.fraunhofer.de/press

The **Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP** works on innovative solutions in the fields of vacuum coating, surface treatment as well as organic semiconductors. The core competencies electron beam technologies, roll-to-roll technology, plasma-activated large-area and precision coating as well as technologies for organic electronics and IC design provide a basis for these activities. Thus, Fraunhofer FEP offers a wide range of possibilities for research, development and pilot production, especially for the processing, sterilization, structuring and refining of surfaces as well as OLED microdisplays, sensors, optical filters and flexible OLED lighting. Our aim is to seize the innovation potential of the electron beam, plasma technology and organic electronics for new production processes and devices and to make it available for our customers.