

**MATCHMAKING
EVENT**



SMART PLASTICS

Lyon

1. THE OPPORTUNITIES & CHALLENGES OF “SMART PLASTICS”

Smart plastics, represent all plastics parts intergrating smart functionalities. Smart plastics are also known as smart polymers or stimuli-responsive polymers, which are high-performance polymers that change according to the environment they are in. These materials can be sensitive to a number of factors such as temperature, humidity, pH, intensity of light or an electrical/ magnetic field. Slight changes in the environment may induce large changes in the properties of these polymers. Smart plastics are part of bigger group of materials, so called Advanced Materials. This group refers to all materials that represent advances over the traditional materials that have been used for years in the manufacturing process and beyond. In a similar fashion, it also refers to all new materials and modifications to existing materials to obtain superior performance¹.

Closely related to smart plastics are Bioplastics. According to European Bioplastics², a plastic material is defined as a bioplastic if it is either biobased, biodegradable, or features both properties. Biobased means that the material is derived from biomass such as corn, sugarcane or cellulose. The production of bioplastics is growing and their use is expanding into different industrial sectors (e.g. packaging, agriculture, medical and automotive parts, or 3D printing)³. The market for bioplastics is growing from 8% to 10% per year. The market share is of approximately 10% to 15% of the total plastics market and is estimated to grow until 25% to 30% by 2020⁴. In 2015 the overall demand for plastics in Europe was 49 million tonnes⁵. According to the Ellen MacArthur foundation⁶, 90% of plastics are derived from virgin fossil fuels, representing about 6% of global consumption, and it is estimated that by 2050 the plastics sector will account for 20% of total oil consumption.

Smart plastics also refer to plastics parts integrating electronic fuctionnalities. Indeed, there are many opportunities related to the development of plastic integrating electronic equipments, such as: miniaturization, improved lightening, 3D functions, reliability and especially drastic reduction of assembly operations. Smart Plastics offer new opportunities to integrate these functionalities and use the properties of polymer materials. These functionalities can be integrated with different tachnologies and processes, such as moulded interconnect device technologies (MID), printed electronics, and sensor encapsulation, to cite some.

The table below summarises some of the opportunities and challenges that characterize the development of smart plastics and bioplastics:

OPPORTUNITIES	CHALLENGES
Reduction of the dependence on virgin fossil fuels	Technological readiness for the adoption of advanced materials such as bioplastics or smart plastics
Reduction of waste through the use of bioplastics	Lack of clear standards
Applications in many different fields: packaging,	Weak economic incentives to adopt bioplastics or

¹ Basbanes, L. V. (2007). *Advanced materials research trends*. Nova Publishers.

² European Bioplastics, <http://www.european-bioplastics.org/bioplastics/>.

³ Bioplastics simplified: Attributes of Biobased and Biodegradable products, February 2016, http://www.plasticsindustry.org/sites/plastics.dev/files/Bioplastics%20Simplified_0.pdf

⁴ Trends in bioplastics and Biocomposites in Development in advanced Biocomposites, Ali Harlin & Minna Vilkmann (eds.), Espoo 2010, VTT Tiedotteita – Research Notes, page 12 – 20, ISBN 978-951-38-7666-1,

⁵ Plastics in Circular Economy : Opportunity and challenges, European Parliament, May 2017 [http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/603940/EPRS_BRI\(2017\)603940_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/603940/EPRS_BRI(2017)603940_EN.pdf)

⁶ The New Plastics Economy: Rethinking the future of plastics, Ellen MacArthur Foundation, January 2016 <https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics>

medicine, aerospace and agriculture among others	smart plastics
Augmented range of design possibilities through smart plastics	Lack of recycling solutions for smart plastics products

2. THE NEED FOR INTER-REGIONAL COOPERATION

The objective of this matchmaking event is to facilitate inter-regional / cross-border cooperation between regional, public and private actors, in the development of joint initiatives / partnerships or joint demonstration projects in smart plastics, matching S3 priorities and exploiting identified synergies and complementary resources and strengths.

An important goal for inter-regional cooperation initiatives in the area of smart plastics concerns strengthening partnerships, which are crucial for the modernization of this sector in Europe. In order to attain this, it is necessary to bring together stakeholders from the plastics and other related industrial sector. Consequently, this would support the initiation of a joint effort towards the development and implementation of strategies that facilitate and accelerate industrial renewal throughout the regions of Europe.

3. EUROPEAN LEVEL INITIATIVES ON SMART PLASTICS

The following initiatives have been identified linked to this matchmaking event on smart plastics:

Efficient and sustainable manufacturing (Vanguard Initiative pilot project):

The aim of GREENOMED is to test and transfer an inter-regional Clusters-centred cooperation methodology aimed at the establishment of a European network of pilot plants supporting green industrial growth in MED Regions, which suffer a lower innovation level compared to the rest of Europe. The final goal of the methodology is to set the basis of an interconnected network of regional pilot plants that will exploit local smart specializations to provide services for the diffusion of green manufacturing solutions. GREENOMED targets mainly regional clusters that with the projects' solution will be able to offer more advanced services to their members, will internationalise their activity and strengthen the relationship with Regional Authorities. On the other hand, companies and research/innovation organizations will benefit from a structured process to become joint protagonists of the construction of the pilot plants system, based on their needs.

Strategy on Plastics in a Circular Economy⁷

The European Commission is developing a new dedicated plastics strategy to help Europe improve recycling, cut marine litter and remove potentially dangerous chemicals. It is the first comprehensive policy response to the plastic challenge, tackling design, manufacturing, use and disposal – a truly strategic approach. Plastics are a priority adopted by the EU in the Circular Economy Action Package⁸ of December 2015.

⁷ Plastic Waste: strategy and background, European Commission 2017

http://ec.europa.eu/environment/waste/plastic_waste.htm

⁸ Circular Economy, European Commission 2017 http://ec.europa.eu/environment/circular-economy/index_en.htm



About Watify

The Watify initiative is an awareness-raising campaign, funded by the European Commission, to support EU efforts to stimulate the modernisation of Europe's industry by:

- Disseminating information to boost the technological transformation of European SMEs
- Supporting Europe's regions to translate their smart specialisation strategies in the areas of digitisation and KETs into concrete projects