Workshop

"Nanotechnologies and Advanced Materials for Regional Growth – The Challenge of upscaling"

Co-organised by RTD, GROW, REGIO, JRC in association with the Committee of the Regions

9 February 2017

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ProDIA - Production, control and Demonstration of structured hybrid nanoporous materials for Industrial adsorption Applications	H2020-NMP-PILOTS-2015	Booklet
POROUS4APP - PILOT PLANT PRODUCTION OF CONTROLLED DOPED NANOPOROUS CARBONACEOUS MATERIALS FOR ENERGY AND CATALYSIS APPLICATIONS	H2020-NMP-PILOTS-2015	Booklet
SKHINCAPS - SKin Healthcare by Innovative NanoCAPsuleS	H2020-NMP-PILOTS-2015	Booklet
PEPTICAPS - Design of polyPEPTIdes diblock copolymers as emulsifiers to produce safe, controlled and reliable novel stimuli-responsive nanoCAPSules for skin care applications	H2020-NMP-PILOTS-2015	Booklet
FOLSMART - Folate-Target Nanodevices To Activated Macrophages For Rheumatoid Arthritis	H2020-NMP-PILOTS-2015	Booklet
MOZART - MesopOrous matrices for localiZed pH-triggered releAse of theRapeuTic ions and drugs	H2020-NMP-PILOTS-2015	Booklet
FAST - Functionally graded Additive Manufacturing scaffolds by hybrid manufacturing	H2020-NMP-PILOTS-2015	Booklet
DIMAP - Novel nanoparticle enhanced Digital Materials for 3D Printing and their application shown for the robotic and electronic industry	H2020-NMP-PILOTS-2015	Booklet
NANOTUN3D - Development of the complete workflow for producing and using a novel nanomodified Ti-based alloy for additive manufacturing in special applications	H2020-NMP-PILOTS-2015	Booklet
PROTECT - Pre-commercial lines for production of surface nanostructured antimicrobial and anti-biofilm textiles, medical devices and water treatment membranes	H2020-NMBP-PILOTS-2016	Booklet
NECOMADA - Nano-Enabled Conducting Materials Accelerating Device Applicability	H2020-NMBP-PILOTS-2016	Booklet
NanoPack - Pilot line production of functional polymer nanocomposites from natural halloysite nanotubes: demonstrating controlled release of active antimicrobials in food packaging applications.	H2020-NMBP-PILOTS-2016	Booklet
FLEXPOL - Antimicrobial FLEXible POLymers for its use in hospital environments	H2020-NMBP-PILOTS-2016	Booklet
INTEGRAL - INitiative to bring the 2nd generation of ThermoElectric Generators into industrial ReALity	H2020-NMBP-PILOTS-2016	Booklet

PILOT LINES REGIONAL MAPPYING – Ongoing process

Project	TRL start & end target	LOCATION of each pilot line (specify partner name and country/region)	REGION
CO-PILOT	4-5 > 6-8	1) Eindhoven, EuRegio, The Netherlands (TNO) 2) Wurzburg, Germany (Fraunhofer ISC) 3) Zell, Germany (SKZ) 4) Chemelot Campus, EuRegio, The Netherlands (Kriya/TNO)	NL,North Brabant DE, Lower Franconia, Bavaria DE, Rhineland-Palatinate, Cochem-Zell NL, Niedersachsen (Osnabrück, Landkreis Osnabrück, southern part of Landkreis Emsland, Bentheim)

			DE, Nordrhein-Westfalen
MACIVIVA	4-5 > 6-7	1) Catalent facilities at Swindon in UK. 2) Upperton at Nottingham in UK. 3) Upperton at Nottingham in UK.	UK, South West UK, East Midlands
NANOPILOT	4-5 > 6-7	1) IK4-CIDETEC/ Spain: GMP Nanopharmaceutical production	ES, Basque Country
INSPIRED	4 > 6	Material-based Pilot Lines: 1.Synthesis of nano-copper including scale-up 2.Synthesis of silver nanowires including scale-up 3.Synthesis of graphene materials including scale-up 4.Formulaton of nanocopper inks including scale-up 5.Formulation of silver nanowires including scale-up 6.Formulation of graphene materials including scale-up Processes-based Pilot Lines: 1.High-volume printing and sintering including development of pilot equipment 2.Development of OSI process as an alternative PV interconnect method Business Case Applications: 1.Design, manufacture, characterise and validate capacitive touchscreens using copper inks 2.Development of LCD system using conductive inks - LC Display demonstrator 3.Development of CIGS cells using copper inks/ AgNWs/GNPs	AU, Styria LV, Courland UK, South East UK, South East England BL, Brussels Region UK, North East ES, Basque Country UK, North East England IT, Emilia-Romagna ES, Galicia
BASMATI	3-4 > 5-6	Identification on going	BE, Brussels region
R2R BIOFLUIDICS	4-5 > 6-7	1) JR 2) EVG 3) BiF	AT, Styria AT, Upper Austria DE, Saxony
HIGH RESPONSE	4 > 6	Identification on going	UK, South West
PLATFORM	4-5 > 6	1: Filtration deposition under vacuum, Partner 1 2: Continuous CNT deposition on prepreg, Partner 2 3. Continuous melt blown filaments, Partner 3	ES, Basque country EL, Achaea PL, Masovian
NANOFACTURING	4-5 > 6-7	1) Midatech Pharma España 2) Midatech Pharma España 3) CPI, Darlington	ES, Basque Country UK, North East

NANOLEAP	4-5 > 6	1) EMPA Swiss Federal Laboratories for Materials Science (Switzerland) 2) Fraunhofer Gesellschaft (IFAM) (Germany) 3) NANTO Cleatech SPA (Italy) 4) Graphenano S.L. (Spain) 5) Fraunhofer Gesellschaft IVV (Germany) 6) IMDEA Nanoscience (Spain) 7) Leibniz Institute of Polymer Research Dresden (Germany) 8) Separex SAS (France) 9) University of Castilla-La Mancha (Spain) 10) University of Castilla-La Mancha (Spain)	Switzerland DE, Free Hanseatic City of Bremen IT, Lombardy ES, Murcia DE, Bavaria ES, Community of Madrid DE, Saxony FR, Alsace-Champagne-Ardenne-Lorraine ES, Castilla-La Mancha ES, Castilla-La Mancha
FOLSMART	5=>6	1: Tubingen	DE, Baden-Württemberg
NanoHybrids	5=>76/7	1) TUHH: Process for production of aerogels in form of (micro)particles 2) BASF: Solvent extraction and supercritical drying on pilot scale 3-1) NESTLÉ aerogel-based prototypes and testing 3-2) Dräger a1erogel-based prototypes and testing 3-3) Arçelik aerogel-based prototypes and testing	DE, Hamburg BE, Flemish Region UK Turkey
ProDia	4-5=>6	1. Pilot production of MOFs by batch synthesis at JM facilities 2. Pilot production of MOFs by batch synthesis at USTAN facilities 3. Pilot production of MOFs by mechano-synthesis at MOFTECH facilities 4. Pilot production of NPMs by SD at Axel'One facilities.	UK, South East England UK, Scotland UK, Northern Ireland FR, Auvergne-Rhône-Alpes
FAST	3=>5	1) University of Maastricht, The Netherland	NL, Limburg
MOZART	4=>5	1) Prelim tests at RTDs facilities 2) DTS, specialist in controlled drug delivery systems will lead to optimise the process for each type of nanomatrices and the scaling-up phase.	Identification on going
SKHINCAPS	4 => 5/6	1: Novel process for nanoencapsulation using water-based formulations, BIONANOPLUS, Spain, Pamplona 2: Process for PCMs nanoencapsulation and application, DEVAN, Portugal, Porto 3: Process for anti-ageing actives nanoencapsulation and application, TELIC, Spain, Barcelona 3: Process for antimicrobial actives nanoencapsulation and application, DEVAN and TELIC.	ES, Navarre PL, Norte ES, Catalunya
DIMAP	2-3=>4-5	CIRP GmbH (SME)	DE, Baden Württemberg

NANOTUN3D	4=>5&6	1) NPs production in lab scale (UPV - Spain). 2) NPs production in pilot scale (LAU - Spain). 3) Ingot bars of nanomodified Ti6Al4V (ZOZ - Germany). 4) ESH risks (VITO - Belgium). 5) Spherical powder of nanomodified Ti6Al4V EIGA (TLS - Germany). 6) Spherical powder of nanomodified Ti6Al4V by VIGA (CEI - Spain). 7) Nanomodified Ti6Al4V additive manufactured by SLM (TWI - UK). 8) Nanomodified TI6Al4V additive manufactured by EBM (AIMME - Spain). 9) Nanomodified Ti6Al4V after melting processed (APR - Italy). 10) Assessment of Ti6Al4V additive manufactured and post-treated (AIMME - Spain).	ES, Valencian Community DE, North Rhine-Westphalia BE, Flanders DE, Saxony ES, Basque country UK, East of England ES, Valencian Community IT, Piedmont ES, Valencian Community
OptiNanoPro	5=>7	1) TUBA (SL) SME 2) SIBO (SL) SME 3) HPX (DE) SME 4) BEL (DE) SME PEMU (HU)) (for validation and demonstration work during the project).	SL, Lublijana DE, North Rhine-Westphalia DE, Bavaria HU, Budapest
PROCETS	5=>7	1) HVOF/UB&CRM; CGS/UB 2) Avanzare 3) Artia Nano-Engineering 4) MBN/MTS 5) Master-batches, Cromomed	ES, Catalunya ES, La Rioja EL, Attica IT, Veneto ES, Valenciana Community
PEPTICAPS	3=>5	1a) Université Claude Bernard Lyon I (FR) OR 1b) University of Basques Country (ES)	FR, Auvergne-Rhône-Alpes ES, Basques Country
IZADI-NANO2INDUSTRY	5=>7	1) Maier ("ESTSTRATCH" injection moulding of B-pillar) 2) FMoraG, (HARDcast gravity casting of swash plate) 3) BRI, ES, (Coating of valve plate) 4) MARION, FR (Pellets producer)	ES, Basque country IT, Lombardy ES, Identification on going FR, Identification on going
POROUS4APP	4-5=>6	Identification on going	ES, Basque Country

BIOGO-FOR-PRODUCTION

Project ID:604296 **Fundedunder**: F**P7-NMP**

Catalytic Partial Oxidation of Bio Gas and Reforming of Pyrolysis Oil (Bio Oil) for an Autothermal Synthesis Gas Production and Conversion into Fuels

From 2013-12-01 **to** 2017-11-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 12 327 112,2	NMP.2013.1.1-1 - Exploration, optimisation and control of nano-catalytic processes for energy applications
EU contribution:	
EUR 9 037 287	**Call for proposal:**
Coordinated in:	FP7-NMP-2013-LARGE-7 See other projects for this call
Germany	**Funding scheme:** CP-IP - Large-scale integrating project

Objective

BIO-GO-For-Production is a Large Scale Collaborative Research Project that aims to achieve a step change in the application of nanocatalysis to sustainable energy production through an integrated, coherent and holistic approach utilizing novel heterogeneous nanoparticulate catalysts in fuel syntheses. BIO-GO researches and develops advanced nanocatalysts, which are allied with advanced reactor concepts to realise modular, highly efficient, integrated processes for the production of fuels from renewable bio-oils and biogas. Principal objectives are to develop new designs, preparation routes and methods of coating nanocatalysts on innovative micro-structured reactor designs, enabling compact, integrated catalytic reactor systems that exploit fully the special properties of nanocatalysts to improve process efficiency through intensification. An important aim is to reduce the dependence on precious metals and rare earths. Catalyst development is underpinned by modelling, kinetic and in-situ studies, and is validated by extended laboratory runs of biogas and bio-oil reforming, methanol synthesis and gasoline production to benchmark performance against current commercial catalysts. The 4-year project culminates in two verification steps: (a) a 6 month continuous pilot scale catalyst production run to demonstrate scaled up manufacturing potential for fast industrialisation (b) the integration at miniplant scale of the complete integrated process to gasoline production starting from bio-oil and bio-gas feedstocks. A cost evaluation will be carried out on the catalyst production while LCA will be undertaken to analyse environmental impacts across the whole chain. BIO-GO brings together a world class multi-disciplinary team from 15 organisations to carry out the ambitious project, the results of which will have substantial strategic, economic and environmental impacts on the EU petrochemicals industry and on the increasing use of renewable feedstock for energy.

FASTCARD

Project ID: 604277 **Funded under**: **FP7-NMP**

FAST industrialisation by CAtalysts Research and Development

From 2014-01-01 **to** 2017-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 11 922 930,2	NMP.2013.1.1-1 - Exploration, optimisation and control of nano-catalytic processes for energy applications
EU contribution:	
EUR 8 234 108	**Call for proposal:**
Coordinated in:	FP7-NMP-2013-LARGE-7 See other projects for this call
Norway	**Funding scheme:**
	CP-IP - Large-scale integrating project

Objective "To meet short term European 20-20-20 objectives and long term targets of European Energy Roadmap 2050, an energy paradigm shift is needed for which biomass conversion into advanced biofuels is essential.
This new deal has challenges in catalyst development which so far hinders implementation at industrial level: Firstly, biomass is much more complex and reactive than conventional feedstock; secondly development of such catalysts is traditionally done by lengthy empirical approaches.
FASTCARD aims at:
-Developing a novel ""rational design"" of nano-catalysts for better control; optimised based on advanced characterisation methods and systematic capture of knowledge by scalable mathematical and physical models, allowing prediction of performance in the context of bio-feedstocks;
-Developing industrially relevant, insightful Downscaling methodologies to allow evaluation of the impact of diverse and variable bio-feedstocks on catalyst performance;
-Addressing major challenges impacting on the efficiency and implementation of 4 key catalytic steps in biobased processes:
• Hydrotreating (HT) and co-Fluid Catalytic Cracking forming the pyrolysis liquid value chain for near term implementation in existing refining units as a timely achievement of the 20-20-20 objectives: addressing challenges of selectivity and stability in HT; increased bio-oil content in co-FCC.
• Hydrocarbon (HC) reforming and CO2 tolerant Fischer Tropsch (FT) forming the gasification value chain for longer term implementation in new European relevant infrastructure, representing 100% green sustainable route for Energy Roadmap 2050: addressing challenges of stability and resistance in HC reforming; stability and selectivity for FT. Advances in rational design of nano-catalysts will establish a fundamental platform that can be applied to other energy applications. The project will thus speed-up industrialisation of safer, greener, atom efficient, and stable catalysts, while improving the process efficiency."

IP4PLASMA

Project ID:604048 **Funded under**: **FP7-NMP**

Industrial innovations based on EU intellectual property assets in the field of atmospheric plasma technology

From 2014-01-01 **to** 2016-12-31, closed project

Project details

Total cost: EUR 4 811 985,8 **EU contribution:** EUR 3 486 875 **Coordinated in:** Finland	**Topic(s):** NMP.2013.4.0-3 - From research to innovation: substantial steps forward in the industrial use of European intellectual assets, stimulating the use of newly developed materials and materials technologies by the industry **Call for proposal:** FP7-NMP-2013-SME-7 See other projects for this call **Funding scheme:** CP-TP - Collaborative Project targeted to a special group (such as SMEs)

Objective

The IP4Plasma project aims to bridge the gap between IPR protected laboratory-scale innovations in the field of atmospheric pressure plasma assisted chemical vapour deposition (AP-PA-CVD) technology and its industrial implementation for advanced surface treatment and nano-scale coating of materials. This will be done by demonstrating the suitability of the technology for existing and new industrial applications in the medical products and diagnostics sector. A mobile pilot scale plasma treatment system will be designed and built for this purpose based on existing experience and IPR protected know-how, and subsequently validated in end user production facilities. In the project, the manufacturers of atmospheric pressure plasma equipment and the end users of the technology will work together with research organisations and experts in technology innovation to overcome the barriers to commercial application of a unique IPR portfolio.This will create new business opportunities with large market potential for the industrial partners involved (mainly SMEs), and thus strengthen their global competitiveness.

SHYMAN

Project ID: 280983 **Funded under**: **FP7-NMP**

Sustainable Hydrothermal Manufacturing of Nanomaterials

From 2012-05-01 **to** 2016-04-30, closed project

Project details

Total cost:	**Topic(s):**
EUR 9 408 524,97	NMP.2011.1.4-1 - Large-scale green and economical synthesis of nanoparticles and nanostructures
EU contribution:	
EUR 6 863 305	**Call for proposal:**
Coordinated in:	FP7-NMP-2011-LARGE-5 See other projects for this call
United Kingdom	**Funding scheme:** CP-IP - Large-scale integrating project

Objective

It is vital that nanomanufacturing routes facilitate an increase in production whilst being 'green', sustainable, low cost and capable of producing high quality materials. Continuous hydrothermal synthesis is an enabling and underpinning technology that is ready to prove itself at industrial scale as a result of recent breakthroughs in reactor design which suggest that it could now be scaled over 100 tons per annum. Academic specialists with international reputations in reactor modelling and kinetics and metrology will develop the 'know how' needed to scale up the current pilot scale system. Selected project partners with expertise in sustainability modelling and life cycle assessment will quantify the environmental impact and benefits of a process that uses water as a recyclable solvent, whilst producing the highest quality, dispersed and formulated products. In addition to scale up production, the process will be improved through case studies with industrial end users in four key areas - printed electronics with SOVY; surface coatings with CRF, PPG and SOVY; healthcare and medical with ENDOR and CERA; hybrid polymers and materials with TopGaN and REPSOL. Further value will be added to the Project by working on new materials that have been identified as key future targets but cannot be currently made, or made in significant quantities. The consortium is founded on the principle that the whole value chain (from nanoparticle production to final product) must be involved in the development of the technology. This will not only inform the development stages of the production process but also maximise 'market pull', rather than simply relying on subsequent 'technology push'.

Smartonics

Project ID: 310229 **Funded under**: **FP7-NMP**

Development of smart machines, tools and processes for the precision synthesis of nanomaterials with tailored properties for Organic Electronics

From 2013-01-01 **to** 2016-12-31, closed project

Project details

Total cost:	**Topic(s):**
EUR 11 548 029	NMP.2012.1.4-1 - Pilot lines for precision synthesis of nanomaterials
EU contribution:	**Call for proposal:**
EUR 7 987 000	FP7-NMP-2012-LARGE-6 See other projects for this call
Coordinated in:	**Funding scheme:**
Greece	CP-IP - Large-scale integrating project

Objective

The target of the Smartonics project is the development of Pilot lines that will combine smart technologies with smart nanomaterials for the precision synthesis of Organic Electronic (OE) devices.
The Smartonics objectives are:
1. Development of smart Nanomaterials for OEs (polymer & small molecule films, plasmonic NPs and super-barriers) by process and computational modeling optimization.
2. Development of smart Technologies (r2r printing and OVPD machines combined with precision sensing & laser tools and processes).
3.Integration of Nanomaterials & Technologies in Pilot lines for precision synthesis of Nanomaterials & OE devices, optimization, demonstration and evaluation for Industrial applications.
Smartonics will develop three Pilot lines: a) OVPD Pilot line equipped with in-line optical sensing tools, b) r2r printing Pilot line, which will combine optical sensing and laser processing tools, and c) s2s Pilot line for the precision fabrication of OE devices (e.g. OLEDs, sensors from state-of-the-art Nanomaterials) and for the evaluation of encapsulation of these devices. The above will be up-scaled in Industrial processes. More specifically:
- The parameters for small molecule OPVs will be up-scaled to Industrial scale OVPD machine.
- The process parameters for r2r OPVs will be up-scaled and demonstrated in r2r printing machines.
- The advances and precision in the synthesis of nanomaterials by the optical sensing tool will be evaluated for flexible displays.
- The advances for the r2r printing process will be evaluated for large-scale production of OPVs.
- The flexible OPVs will be validated and implemented in automotives applications.

All the above are consistent with the topic NMP.2012.1.4-1 since the the targets of project are including the development of Pilot lines that will be combined with production machines (gas (transport and printing), precision and fabrication tools and processes for the precision synthesis of Nanomaterials and OEs.

CO-PILOT

Project ID: 645993 **Funded under**:
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies
H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems

Flexible Pilot Scale Manufacturing of Cost-Effective Nanocomposites through Tailored Precision Nanoparticles in Dispersion

From 2015-01-01 **to** 2017-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 5 475 358,75	NMP-01-2014 - Open access pilot lines for cost-effective nanocomposites
EU contribution:	**Call for proposal:**
EUR 5 021 858,5	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Netherlands	RIA - Research and Innovation action

Objective

The CO-PILOT project addresses the field of nanocomposites which has witnessed remarkable progress (compound annual growth rate of 18%) in recent years with many different types of nanocomposites exhibiting radically enhanced properties for a wide range of industrial applications.

The CO-PILOT project aims to develop an open access infrastructure for SMEs interested in the production of high quality (multi-)functional nanocomposites on a pilot scale.
In CO-PILOT this infrastructure will be prepared for access ('open acess') by SME's beyond the project. It will be able to produce typically 20 to 100 kg nanocomposite product, characterize it and validate its performance. This is sufficient to make management decisions to progress to the next step of new nanocomposite product development.

CO-PILOT aims to set new standards for high-quality nanoparticle production with the assistance of in-line nanoparticle dispersion quality monitoring.
CO-PILOT chooses to develop a centrifuge module to address the adequate and automated down-stream processing of the nanoparticle dispersions.

CO-PILOT will test and validate the pilot line infrastructure. Based on the consultation of SME nanocomposite producers, CO-PILOT has chosen the following range of industrial nanocomposite applications :
- flame and smoke inhibiting polymer materials (layered double hydroxides)
- acid scavenging used as anti-corrosion and in polymer stabilisation (layered hydroxides)
- heat isolating plastics (hollow/porous silica)
- light-weight flame inhibiting composites (layered hydroxides combined with hollow/porous silica)
- UV protective polymer coatings (zinc oxide, titanium dioxide)
- high refractive index, visually transparent polymer (titanium dioxide)
- low-refractive index polymer (hollow/porous silica)
- anti-glare polymer coatings (hollow/porous silica)
- magnetic recoverable catalyst nano-composite beads (magnetite

PLATFORM

Project ID:646307 **Funded under**:
H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems

Open access pilot plants for sustainable industrial scale nanocomposites manufacturing based on buckypapers, doped veils and prepregs

From 2015-02-01 **to** 2018-01-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 797 727,5	NMP-01-2014 - Open access pilot lines for cost-effective nanocomposites
EU contribution:	**Call for proposal:**
EUR 7 797 727,5	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

Two FP7 European projects ELECTRICAL and SARISTU aim to develop methods to manufacture CNT reinforced multifunctional composites compatible with current industrial manufacturing processes. According to the results, three CNT integration strategies appear as promising methods to be driven towards an industrial scale manufacturing process: buckypapers, CNTtreated prepreg and CNT doped nonwoven veils. Although each of the technologies can act separately they can be combined synergistically in a way that a higher multifunctional level can be achieved according to the final requirements of the application.
This project aims to develop open access pilot lines for the industrial production of buckypapers, CNT treated prepreg and CNT doped non-woven veils for composite applications in sectors such as Aeronautic and Automotive. The purpose is to efficiently and economically manufacture components using novel developed at a scale suitable for industrial uptake. The developed facilities will not only provide increased capabilities to the operating company but also offer a network of nanorelated manufacturing facilities suited to the needs of related SMEs. A European platform of nanobased pilot lines will be created to which companies, and more precisely SMEs, can gain access and make use of the facilities as well as the experience and knowledge of the operating RTO.The partners will work with existing EU clusters and initiatives aimed at the establishment of an EU nanosafety and regulatory strategy framework to ensure the safe use of these products particularly at an industrial scale. This will be achieved through collaboration with end users to ensure the developed products are accepted within existing health and safety procedures or through the introduction of new ones.PLATFORM proposes solutions that will generate new market opportunities for European Aeronautic and Automotive components manufacturing offering to OEMs new added-value products based on nano-enabled products

NANOLEAP

Project ID:**646397** Funded under:
H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems

"Nanocomposite for building constructions and civil infraestructuras: European network pilot production line to promote industrial application cases."

From 2015-01-01 **to** 2018-06-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 679 159,25	NMP-01-2014 - Open access pilot lines for cost-effective nanocomposites
EU contribution:	**Call for proposal:**
EUR 6 878 348,75	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

NANOLEAP project aims at the development of a coordinated network of specialized pilot lines for the production of nanocomposite based products for different civil infrastructure and building applications.
The goal of this infrastructure is to support the research activities of European SMEs in the Construction sector in nanocomposite products enabling the progress of the product to next steps of technology deployment such as installation of industrial pilot lines and enter in the commercialization stage.
For the creation of the NANOLEAP project pilot line network, the most promising applications of polymeric nanocomposites in the construction and engineering sector have been selected. This project will support the pilot lines for the scaling up and production of these nanocomposite based products in order to facilitate their further adoption by the entire construction chain:

- Antiweathering and anticorrosion nanocomposite coatings for the protection of structures exposed to aggressive environments such as wind turbines, offshore, marine infrastructure.
- Multifunctional polymeric nanocomposites providing smart applications to traditional construction materials such as concrete and coatings including self-cleaning, hydrophobicity, optical properties, early warning crack and water leak alarm.
- Prefab non-structural elements such as aerogels mechanically reinforced with nanoparticles for high-thermal insulation applications in building insulation. .
- Coated nanoparticles with improved compatibility with the matrix providing a wide range of functionalities and leading to high quality products and important saves of energy.

In order to implement and demonstrate this approach, NANOLEAP project brings together a European Network of pilot production facilities focused on scaling up nanocomposite synthesis and processing methods.

ATLASS

Project ID: 646130 **Funded under**:
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

Advanced high-resolution printing of organic Transistors for Large Area Smart Surfaces

From 2015-03-01 **to** 2018-08-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 883 005	NMP-04-2014 - High-definition printing of multifunctional materials
EU contribution:	**Call for proposal:**
EUR 6 508 043,38	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
United Kingdom	IA - Innovation action

Objective

Bringing intelligence and communication to everyday objects is a major challenge for future electronics. This « Internet of Things » concept envisions wide dissemination with new performances: robustness, large area, flexibility, ecoefficient large volume manufacturing at low cost. Beyond current TOLAE demonstration, a major technology jump driving the scalability towards nanoscale resolution via high-definition cost-effective printing is required to deliver the properties and electrical performances expected by applications. ATLASS Innovation Action takes this huge step by bringing high resolution technologies to the printing industries for the demonstration of products at TRL6 in high impact markets. New multifunctional high-performing inks (semiconductor mobility >1cm2/Vs, dielectrics, ferroelectrics) and high-resolution (down to 500nm and ~100nm thickness) R2R/S2S printing including nano-imprinting and gravure printing will be engineered and scaled-up on pre-industrial pilot lines, enabling high performance devices (speed ~ 10 MHz). Inline control and novel automatic optical inspection tools and methodology will be installed to ramp-up the yield of developed processes (>99%) thus enabling cost-efficient fabrication of advanced circuits (>1000 transistors, 50kHz clock rate). The technology capability is benchmarked with conventional TOLAE process and demonstrated with 4 applications in the field of Interactive objects and Sensing surfaces (temperature tag for smart food packaging, electronic label for logistics, impact force sensing foils for automotive safety -, proximity sensing for safer human-robot collaboration). With a consortium of 11 top companies (7 SMEs) from the cutting-edge, fast growing printed electronics sector and 4 RTOs with high-level technology expertise, ATLASS will strongly impact the global market of sensors, labels and smart objects expected to reach revenue of several EUR billion with printed sensors' share of EUR 644 million by 2022.

R2R Biofluidics

Project ID:646260 **Funded under**:
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

Large scale micro-and nanofabrication technologies for bioanalytical devices based on R2R imprinting

From 2015-02-01 **to** 2019-01-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 929 411	NMP-04-2014 - High-definition printing of multifunctional materials
EU contribution:	**Call for proposal:**
EUR 6 421 672,57	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Austria	IA - Innovation action

Objective

Roll-to-roll (R2R) technologies are mature core processes in manufacturing lines for graphical printing industry. In several other areas (e.g. electronics or optics) R2R techniques are emerging, being expected to notably lower the unit prices of flexible devices.

In particular, recently developed roller-based nanoimprinting methods enable unrivalled throughput and productivity for precise fabrication of micro- and nanoscale patterns.
Areas that will benefit strongly from adopting such R2R nanoimprinting technologies are microfluidics and lab-on-chip products for diagnostics, drug discovery and food control. Such devices require combined printing of micro- and nanostructures and large quantities at low unit costs.

The project R2R Biofluidics aims on the development of a complete process chain for first-time realization of production lines for two selected bioanalytical lab-on-chip devices based on high-throughput R2R nanoimprinting in combination with complementary printing and manufacturing technologies.

Two types of demonstrators will be fabricated targeting application areas, which would clearly benefit from technology advancement in high volume manufacturing, show large potential for commercial exploitation and adopt current standard formats (microtiter plate and microscope slides).

Demonstrator 1 will represent an in-vitro diagnostic (IVD) chip suitable for point-of-care applications, showing improved sensitivity thanks to imprinted nanoscale optical structures and microfluidic channels. R2R fabrication will further greatly reduce production costs and increase manufacturing capacity with respect to currently used products.

Demonstrator 2 will provide a device for improved neuron based high-throughput screening assays in drug development. It will consist of nano- to microstructured, interconnected channels in combination with dedicated biofunctionalized surfaces for alignment and controlled growth of neurons.

Hi-Response

Project ID:646296 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

Innovative High Resolution Electro-Static printing of Multifunctional Materials.

From 2015-03-01 **to** 2018-08-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 887 826,25	NMP-04-2014 - High-definition printing of multifunctional materials
EU contribution:	**Call for proposal:**
EUR 6 444 022,63	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
United Kingdom	IA - Innovation action

Objective

The ELI is well placed to exploit printed electronic technologies to create greater economic and social benefits for the ELI, but only if we are able to commercialise innovative technologies created within the ELI.

Inkjet printing technologies are at the forefront of printed electronic developments. However, Inkjet printing has only been able to achieve a resolution of > = 10um and the viscosity of printable inks is limited to <40 centipoise, this further limits the solids content of inks to <30-Vol% and the size of the nano-fillers to <50nm typically. These factors limit the range of functional inks that can be printed as well as the resolution and final properties of the resultant printed/sintered structures and components.

The HI-RESPONSE project is based on highly innovative, patented Electro-static printing technology (ESJET) that has already been proven on TRL 4 to print to a resolution of lum and be able to print inks with a viscosity of up to 40.000 cP. The resultant printed/sintered structures will therefore be able to achieve a high resolution and increase final component properties through enabling the printing of highly filled nano-inks and functional organic materials.

This technology will be further developed to TRL 6 within the project to allow for the design and assembly of a multihead system that can achieve resolution, speeds and cost that far surpassed that of current ink-jet systems. The resultant system will be demonstrated at TRL 6 for a wide range of materials, including: nano-Cu and nano-ceramic filled inks and organic polymers. Each of these materials will be printed to create components specifically defined and specified by the industrial organisations within the consortium: Infineon, Ficosa, Piher (Meggitt) and Zytronic. The specific end-user defined applications are: Automotive aerials and sensors, metal meshed for OLED and touch screens, conductive through silicon vias and mechanical strengthening ribs for thin Si-wafers.

INSPIRED

Project ID: 646155 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

INdustrial Scale Production of Innovative nanomateRials for printEd Devices

From 2015-01-01 **to** 2018-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 005 838,79	NMP-05-2014 - Industrial-scale production of nanomaterials for printing applications
EU contribution:	
EUR 6 414 871,8	**Call for proposal:**
Coordinated in:	FI2020-NMP-PILOTS-2014 See other projects for this call
Austria	**Funding scheme:** IA - Innovation action

Objective

Printed electronics (PE) is set to revolutionise the electronics industry over the next decade and can offer Europe the opportunity to regain lost market share. Printed electronics allows for the direct printing of a range of functional (conductive, resistive, capacitive and semi-conducting) nanomaterials formulations to enable a simpler, more cost- effective, high performance and high volume processing in comparison to traditional printed circuit board and semiconductor manufacturing techniques. It has been reported by Frost and Sullivan that the market for printed electronics will increase in revenues from $0.53Bn in 2010 to $5.04 Bn in 2016 ata compound annual growth rate of 32.5%.
Flowever, the migration towards low-cost, liquid-based, high resolution deposition and patterning using high throughput techniques, such as inkjet printing, requires that suitable functional nanomaterials formulations (e.g. inks) are available for end users in industrially relevant quantities. Presently, there are issues with industrial supply of nanomaterials which are low cost, high performance, environmentally friendly and tailored for high throughput systems. Therefore better collaboration is warranted between supply chain partners to ensure nanomaterial production and nanomaterial formulations are tailored for end use applications to meet this need.
The INSPIRED project will address these fundamental issues within the printed electronics industry: Ensuring that suitable functional nanomaterials formulations (inks) are available for end users in industrial scale quantities. Production of these nanomaterial formulations on an industrial scale and then depositing them using cost-effective, high throughput printing technologies enables rapid production of printed electronic components, on a wide variety of substrates. Therefore, enabling new electronics applications, whilst overcoming the problems associated with traditional manufacturing.

BASMATI

Project ID: 646159 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

Bringing innovAtion by Scaling up nanoMATerials and Inks for printing

From 2015-01-01 **to** 2017-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 6 136 703,75	NMP-05-2014 - Industrial-scale production of nanomaterials for printing applications
EU contribution:	
EUR 5 000 359,75	**Call for proposal:**
Coordinated in:	H2020-NMP-PILOTS-2014 See other projects for this call
Belgium	**Funding scheme:** IA - Innovation action

Objective

The BASMATI project will address the development of active nanomaterial and electrochemical inks for printing technologies such as screen and inkjet printing. The ink formulations will be tested on a case study through printing of a thin film battery. The general objective of the project is to scale-up the ink formulations to pilot line ensuring large volume fabrication of new products with improved properties for printing application. Especially, the particles definition at nanometer size will be one key parameter for the compatibility in inkjet printing. Moreover, knowledge will also be generated on electrochemical inks formulation and additives used in order to stabilize the ink products.
The concept of nanomaterials for printing application will be applied to flexible printed electronics and more specifically to printed batteries. These printed batteries are needed as power source at the closest part and the development of printed electronics so as to as to design an all-in-one product allowing better process ability in inkjet process for 3D design and 2D screen printing process.
BASMATI will also provide a new source of nanomaterials for the formulation of conductive and electrochemical inks. These nanomaterials will be metallic particle (Ni, Cu, Al) that will be usable for numerous applications of printed electronic on flexible substrate. Another type of nanomaterials will be layered positive active material such as LiNil/3Mnl/3Col/302 (NMC) and olivine LiFeP04 (LFP).
The know-how level reached in BASMATI by research groups and transfer and up-scale to pilots (TRL 6) at SMEs and industry facilities will pave the way for future industrialization of inks formulations production for mass markets such as printed electronics. The compatible formulations in high throughput technologies will ensure a reproducible and reliable process for sophisticated fully digital micro-structured devices. Nanosafety will also be carefully considered in BASMATI project.

MACIVIVA

Project ID: 646122 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

MAnufacturing process for Cold-chain Independent VIrosome-based VAccines

From 2015-05-04 **to** 2018-11-03, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 438 905,63	NMP-08-2014 - Scale-up of nanopharmaceuticals production
EU contribution:	**Call for proposal:**
EUR 5 338 886,88	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Netherlands	RIA - Research and Innovation action

Objective

MACIVIVA is a highly interdisciplinary consortium among well established and innovative SMEs with scientific excellence and complementary industrial world-leading experts with unique expertise and know-how in virosome technology, spray and freeze drying, large scale manufacturing and packaging. MACIVIVA will pave the path to other large scale thermostable nanopharmaceuticals products for therapeutic and prophylactic vaccines and other potential applications for direct application by non-invasive routes.
Liquid products are inherently prone to physical and/or chemical modifications and degradations. Solid vaccine dosage formats (e.g. powder) may prevent molecular motion and shear-induced degradation, and slow down degradation involving water and oxygen radicals, resulting in improved stability and enhanced shelf-life of vaccines. The cold chain storage is still fundamental for preserving the bioactivity of most liquid and freeze-dried vaccines, and a reconstitution step prior to administration is required for freeze dried vaccines that are usually administered intramuscularly or subcutaneously. These reconstituted freeze dried vaccines harbor important instability and must be used within hours and kept refrigerated. Because most liquid and reconstituted freeze-dried vaccines are susceptible to degradations, it may affect the immunological properties of the immunogens, with unwanted immune responses or insufficient immune protection.
For addressing liquid virosome-based vaccine instability and improving their shelf-life outside the cold chain, MACIVIVA will explore new galenic vaccine formulations through careful screening of excipients, stabilization and drying methods for generating new vaccine solid forms that can be easily self-administered. Robust "universal" manufacturing processes for upscale production of virosome dried powder for the non-invasive intranasal, oral and sublingual routes should be achieved by month 42.

NanoPilot

Project ID:646142 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

A Pilot Plant for the Production of Polymer based Nanopharmaceuticals in Compliance with GMP

From 2015-01-01 **to** 2018-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 6 283 988,75	NMP-08-2014 - Scale-up of nanopharmaceuticals production
EU contribution:	**Call for proposal:**
EUR 6 283 988,75	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

The aim of NanoPilot will be to set-up a flexible and adaptable pilot plant operating under GMP for the production of small batches of polymer-based nanopharmaceuticals, which exhibit significant potential in the field of drug-delivery particularly for the design of second-generation nanopharmaceuticals.
Three different processes will be established for the production of three different nanopharmaceuticals selected on the basis of their TRL and positive commercial evaluation: a) topical treatment of ocular pain associated with dry eye syndrome containing short interfering RNA and lactic acid, b) A resuspendable HIV nanovaccine for intranasal vaccination containing 12 peptides in its formulation, c) Hyaluronan based hollow spheres intended for intravesical instillation, for the treatment of interstitial cystitis/painful bladder syndrome.
State of the art production processes including micro reactors and highly advanced characterization techniques will ensure the quality of the nanodrugs. Existing laboratories suitable for large-scale production of biologies in compliance with GMP, and owned by the coordinator, will be adapted and certified within this project to enable the operability of the pilot plant.
NanoPilot consists of nine complementary partners composed by 1 Industry and 2 academia developers of the nanosystems to scale-up. A research Institute expert in nanoparticle characterizacion and already operating in compliance with Good laboratory practices. An SME and an Industry that will develop ad-hoc continuous flow reactors for the optimization of two of the three processes. A consultancy (SME) expert in Quality system implementation and laboratory information management systems. A second consultancy (SME) in charge of the business plan, that will also help the coordinator in dissemination and exploitation activities. Finally, a research centre with a recorded track in nanomedicine, already operating under ISO 9001, and will be in charge of the pilot plant.

NANOFACTURING

Project ID:646364 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems

The Development of Medium- and Large-Scale Sustainable Manufacturing Process Platforms for Clinically Compliant Solid Core Nano pharmaceuticals

From 2015-02-01 **to** 2019-01-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 341 906,75	NMP-08-2014 - Scale-up of nanopharmaceuticals production
EU contribution:	**Call for proposal:**
EUR 7 898 781,5	H2020-NMP-PILOTS-2014 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

A number of nanomedicine formulations have enabled, or been shown to hold considerable potential for enabling more effective and less toxic therapeutic interventions. However, progress to date in translating these initiatives to commercial success has been limited. One of the main reasons for this bottleneck is due to the inability of researchers and stakeholders to manufacture batches of the nanomedicine product at the required scale and according to Good Manufacturing Practice (GMP) requirements. The NANOFACTURING project will focus on

- facilitating access to required infrastructures and expertise
- creating GMP pilot lines for up-scaling manufacturing
- addressing the current developmental and production gaps
- taking nanomaterials already successfully produced at proof-of-concept/milligram levels and facilitating their scale-up to sub-kilogram quantities
- providing large-scale and GMP production for clinical trials and nanomedicine translation.

The NANOFACTURING project, through a consortium of 9 partners, will develop the synthetic processes, process control methods, analytical assays for QA/QC, functional specifications, and best practices, interfacing existing R&D centres of excellence, transfer organisations and private GMP manufacturing facilities (including SMEs) to ensure efficient translation from discovery through to first in man, proof-of-concept studies and beyond to Phase III according to industrial and regulatory standards. Specifically, the NANOFACTURING project aims to create a platform process for early, mid- and large-scale manufacturing of glycan-coated gold nanoparticles (GNPs), a widely researched and developed class of self-forming nanoparticles. The ability to engineer new nanopharmaceuticals based on this patent protected platform technology, developed by Midatech Biogune S.L. (Project Coordinator), will have inherent advantages over existing treatments for multiple therapeutic areas.

OptiNanoPro

Project ID: 686116 **Funded under:**
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Processing and control of novel nanomaterials in packaging, automotive and solar panel processing lines

From 2015-10-01 **to** 2018-09-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 6 920 685	NMP-02-2015 - Integration of novel nano materials into existing production lines
EU contribution:	
EUR 5 516 910	**Call for proposal:**
Coordinated in:	H2020-NMP-PILOTS-2015 See other projects for this call
Spain	**Funding scheme:**
	IA - Innovation action

Objective

Nanocomposites are promising for many sectors, as they can make polymers stronger, less water and gas permeable, tune surface properties, add functionalities such as antimicrobial effects. In spite of intensive research activities, significant efforts are still needed to deploy the full potential of nanotechnology in the industry. The main challenge is still obtaining a proper nanostructuring of the nanoparticles, especially when transferring it to industrial scale, further improvements are clearly needed in terms of processing and control.

The OptiNanoPro project will develop different approaches for the introduction of nanotechnology into packaging, automotive and photovoltaic materials production lines. In particular, the project will focus on the development and industrial integration of tailored online dispersion and monitoring systems to ensure a constant quality of delivered materials. In terms of improved functionalities, nanotechnology can provide packaging with improved barrier properties as well as repellent properties resulting in easy-to-empty features that will on the one hand reduce wastes at consumer level and, on the other hand, improve their acceptability by recyclers. Likewise, solar panels can be selfcleaning to increase their effectiveness and extend the period between their maintenance and their lifetime by filtering UV light leading to material weathering. In the automotive sector, lightweight parts can be obtained for greater fuel efficiency.

To this end, a group of end-user industries from Europe covering the supply and value chain of the 3 target sectors and using a range of converting processes such as coating and lamination, compounding, injection/co-injection and electrospray nanodeposition, supported by selected RTDs and number of technological SMEs, will work together on integrating new nanotechnologies in existing production lines, while also taking into account nanosafety, environmental, productivity and cost-effectiveness issues.

PROCETS

Project ID: 686135 **Funded under:**
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

PROtective composite Coatings via Electrodeposition and Thermal Spraying

From 2016-01-01 **to** 2019-06-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 651 911,98	NMP-02-2015 - Integration of novel nano materials into existing production lines
EU contribution:	
EUR 6 976 663,39	**Call for proposal:**
Coordinated in:	H2020-NMP-PILOTS-2015 See other projects for this call
Greece	**Funding scheme:**
	IA - Innovation action

Objective

Wear and corrosion of materials causes losses of 3-4% of GDP in developed countries and billions of Euros are spent annually on capital replacement and control methods for wear and corrosion infrastructure. As a result many important industries are dependent on surface engineering of protective coatings, making it one of the main critical technologies underpinning the competitiveness of ELI industry. There are 2 main techniques that dominate the protective coatings sector: hard chromium (HC) plating and thermal spray (TS). However, HC plating faces a series of issues with most important the extremely negative health and environmental impact leading to the EC restriction of this method for using Cr+6 by the end of 2017. Similarly, recent toxicity studies concerning Co-WC cermet applied by TP have revealed that Co-WC particles are toxic in a dose/time-dependent manner. Consequently, there is the necessity of finding new, less hazardous methods and materials exhibiting the same or better performance compared to existing ones.
The PROCETS project will took advantage of the use of nano-particles for production of composite coatings with superior properties compared to those of HC produced by electroplating or to Co-WC produced by TS. These novel nano-particles will be incorporated into existing production lines after appropriate modifications. The new procedures will be easily transferred by minor adaption to the present electroplating and TS facilities, and will combine flexibility and mass customization abilities, restrict environmental and health hazards and finally be available at acceptable cost. Thus, PROCETS main target is to deliver protective coatings covering a wide range of applications such as automotive, aerospace, metal-working, oil and gas and cutting tools industries via thermal spray and electroplating methods by utilizing more environmental friendly materials, compared to the currently used.

NanoHybrids

Project ID:685648 **Funded under:**
H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

New generation of nanoporous organic and hybrid aerogels for industrial applications: from the labto pilot scale production

From 2015-11-01 **to** 2019-04-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 354 905,75	NMP-03-2015 - Manufacturing and control of nanoporous materials
EU contribution:	**Call for proposal:**
EUR 3 678 305,25	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Germany	IA - Innovation action

Objective

The main objective of the project is the development of the pilot scale production system of the new generation of nanoporous organic and hybrid aerogels with multiple functions for application in gas and humidity adsorption, personal care and food. Thereby the fast manufacturing in form of spherical particles will be in focus in order to reduce the process time and to decrease the overall process costs. Thereby the purpose is to insure the high porosity and internal pore size distribution of the particles in order to provide the high surface area, pore volume and defined pore size needed for good adsorption capability. The production of organic aerogel particles in sufficient amounts will firstly enable the possibility to build prototypes for the applications in gas and humidity adsorption and food and to perform the corresponding tests. Based on the results of the test the properties of aerogels will be fine-tuned for the corresponding real applications in industrial environments. By this means it is intended to increase the technology readiness level of organic aerogels production from TLR 4 to TLR 6 by the end of the project.

IZADI-NAN02INDUSTRY

Project ID:686165 **Funded under:**
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Injection moulding, casting and coating PILOTS for the production of improved components with nano materials for automotive, construction and agricultural machinery.

From 2015-11-01 **to** 2018-10-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 468 976,25	NMP-02-2015 - Integration of novel nano materials into existing production lines
EU contribution:	
EUR 6 027 653	**Call for proposal:**
Coordinated in:	H2020-NMP-PILOTS-2015 See other projects for this call
Spain	**Funding scheme:**
	IA - Innovation action

Objective

In the frame of previous FP6 and FP7 projects with involvement of IZADI-NAN02INDUSTRY consortium members nanotechnologies have demonstrated their effectiveness for enhancing materials and manufacturing processes performance up to a certain level tested in intended environment (TRL 5). Different nanotechnology based strategies have been addressed to develop methods to improve thermoplastics and metallic parts using current industrial manufacturing processes. Three strategies appear promising to be further implemented in real component manufacturing production plants: master-batches for thermoplastics, master-pellets for metals and nanostructured powders for metallic coatings.
IZADI-NAN02INDUSTRY project proposes different solutions based on KETs such as nanotechnology, advanced materials and advanced manufacturing. The project aims to implement the master-batches, the master-pellets and the nanostructured powders in three innovative PILOTS, developed and installed at three existing production plants that will effectively manufacture real components (B-pillar, Swash plate and Valve plate) integrating safe-by-design approaches into the developments stages. The project follows to develop inherently safer production methods. IZADI-NAN02INDUSTRY is an industry driven project with up to 44% of the budget devoted to SMEs. It proposes solutions that will generate new market opportunities for European Automotive, Construction and Agricultural Machinery sectors offering to OEMs new added-value products.
IZADI-NAN02INDUSTRY project is supported by the government of the regions where the PILOTS will be installed. The project addresses an innovation action that is in line with the Basque Country, Lombardy and Emilia-Romagna region's RIS-3 Smart Specialization Strategy.

Pro DIA

Project ID: 685727 **Funded under:**
H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Production, control and Demonstration of structured hybrid nanoporous materials for Industrial adsorption Applications

From 2015-11-01 **to** 2018-10-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 956 937,5	NMP-03-2015 - Manufacturing and control of nanoporous materials
EU contribution:	**Call for proposal:**
EUR 7 030 831,5	FI2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Norway	IA - Innovation action

Objective

The recent 20 years have seen the discovery of new classes of nanoporous materials (NPM). It includes amorphous micro-mesoporous aluminosilicate type materials and more recently Metal-Organic Frameworks (MOF). Despite the great potential of this new class of materials, we cannot recognize industrial success yet at the level of initial expectations and business opportunities.
The main reasons which limit the penetration of these materials on the market are that there is a very limited choice of materials available on the market with prices and shapes (powder) which are not compatible for a first demonstration.
In this respect, the objectives of ProDIA are:
- To develop production technologies and methods including shaping, for MOF and aluminosilicates, which are price competitive or at least in the same range as other state of the art porous solids such as advanced zeolites or carbons
- 10-100 €/kg
- To set-up production facilities in Europe for the production of a variety of NPM with chemical and mechanical stabilities and with safety requirements which allow them to be sold, distributed and used in the industry.

The project will thus develop three innovative processes (water-based synthesis, mechanosynthesis, spray-drying) for cost-effective production of NPMs meeting industrial expectations with improved reliability and repeatability at pilot- scale. The industrial relevance of these NPMs will be demonstrated in four applications: gas storage, air purification, heat pump and health care.
The consortium is composed of 5 RTO, 1 university and 1 association together with 6 industrial partners, including 2 SMEs and a spin-off being created; linking technology providers and academic partners with industrial end-users. The consortium has well-balanced skill sets to achieve its objectives.
The financial resources mobilized by the 13 partners represent a total grant of 7 604 940 € with a global effort of 757 PM.

POROUS4APP

Project ID:686163 **Funded under:**
H2020-EU.2.1.2.4. - Efficient and sustainable synthesis and manufacturing of nanomaterials, components and systems
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

PILOT PLANT PRODUCTION OF CONTROLLED DOPED NANOPOROUS CARBONACEOUS MATERIALS FOR ENERGY AND CATALYSIS APPLICATIONS

From 2016-03-01 **to** 2020-02-29, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 944 717,4	NMP-03-2015 - Manufacturing and control of nanoporous materials
EU contribution:	**Call for proposal:**
EUR 6 535 878	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	IA - Innovation action

Objective

The main idea of POROUS4APP project is based on the fabrication of functional nanoporous carbonaceous materials at pilot plant scale from natural resources (polysaccharide). The process for nanoporous carbon fabrication is already well known as one of the POROUS4APP partner has developed the STARBON® technology atTRL5 which consist of swelling, drying and pyrolysis of natural resources and in this case Starch. What POROUS4APP project will bring to the European community is the development of new metal/metal-oxide doped-nanoporous carbonaceous materials based on a known technology. This technology needs to be upscaled and modified to enable a full flexibility of the material characteristics to be applied to various industrial applications.
The use of abundant renewable resources like starch has been proven to be a low cost and reliable raw material source for industrial production of carbonaceous materials having porosity in the nanometer range. In POROUS4APP it will be intended to produce not only carbonaceous nanoporous materials but carbonaceous material with enhanced functionality by using impregnation and sol/gel strategy. This will allow POROUS4APP materials to reach the challenging requirements of state of the art high added value materials at lower cost for applications in energy storage such as lithium-ion battery and also in chemical catalysis process. These applications need materials with well defined porosity to reach high efficiency level of their functional systems.

SKHINCAPS

Project ID:685909 **Funded under:**
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.3. - Developing the societal dimension of nanotechnology
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

SKin Healthcare by Innovative NanoCAPsuleS

From 2015-10-01 **to** 2019-09-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 265 920,75	NMP-06-2015 - Novel nanomatrices and nanocapsules
EU contribution:	**Call for proposal:**
EUR 3 265 920,75	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Portugal	RIA - Research and Innovation action

Objective

SKHINCAPS project will explore an innovative and sustainable in situ self-assembly nanoencapsulation technology to deliver novel products for skin healthcare applications, with increased efficiency and cost benefits, leading to groundbreaking innovations on the actual products.
Using this safe, sustainable and easily scalable technology, different actives will be addressed for nanoencapsulation: phase-change materials (PCMs), a cocktail of vitamins and antioxidants, and natural essential oils. The nanocapsules will be engineered to achieve three possible release mechanisms, enhancing actives efficiency.
Different demonstrators will be developed with these customised and safe nanocapsules for skin healthcare applications:
- First layer garments with no-release nanocapsules loaded with PCMs, to improve thermal management and skin comfort;
- Creams with triggered nanocapsules containing the cocktail, to improve the anti-ageing effect on the end-users skin;
- Lotions and textiles containing targeted nanocapsules loaded with natural essential oils to prevent or even mitigate bacterial infections on the end-users skin.
These demonstrators will be fully tested for their safety and performance assessment to fulfil the present regulation requirements.
SKHINCAPS comprises SMEs from different stages of the supply chain, so it will promote stronger collaborations between materials suppliers, manufacturers and end-users. SKHINCAPS is therefore entirely aligned with the European 2020 strategy, contributing to boost competitiveness and support the creation of jobs and new sources of growth. SKHINCAPS is also committed with the flagships initiatives, and with a number of wider H2020 objectives including: control healthcare expenditure, H2020 strategic cosmeceuticals sector and plural H2020 Key Enabling Technologies (KETs).

PEPTICAPS

Project ID:686141 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.3. - Developing the societal dimension of nanotechnology
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Design of polyPEPTIdes diblock copolymers as emulsifiers to produce safe, controlled and reliable novel stimuli-responsive nanoCAPSules for skin care applications

From 2015-10-05 **to** 2018-10-04, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 852 293,75	NMP-06-2015 - Novel nanomatrices and nanocapsules
EU contribution:	**Call for proposal:**
EUR 3 852 293,75	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

PeptiCaps aims at producing and validating a new family of stimuli-responsive nanocapsules able to encapsulate efficiently and protect specific active ingredients for skin care application. Those nanocapsules will be assembled by nanoemulsion technique using amphiphilic and biocompatible polypeptides diblock copolymers with one hydrophilic poly(ethylene glycol) block and one hydrophobic polypeptide block. Adjustment of the length of each block to finely tune the hydrophilic/Lipophilic balance of the macroemulsifier will allow the encapsulation of either hydrophobic or hydrophilic active ingredients. In addition, polypeptides block will be specifically designed to respond to changes in pH and the presence of enzyme occurring for the skin conditions targeted to allow a triggered release of the active ingredient. After scaling-up selected macroemulsifiers under GMP-like process, two manufacturing processes will be used for the production of the nanocapsules, i.e. high-pressure homogenizer and tubular flow contactor. The most promising process will be selected to produce selected nanocapsules. Physico-chemical properties and (eco)toxicity of the nanocapsules will be extensively characterised using techniques and protocols recommended by the EU Cosmetic regulation to establish their risk and safety assessment. The advantages of safe nanocapsules from PeptiCaps will be demonstrated on validated relevant skin models for each application. All results obtained will be gathered to constitute a Dossier for the validation of the nanocapsules as cosmetic product by the authorities. In addition, PeptiCaps will actively participate to the standardization for nano-safety by developing software to predict the toxicity of nanomaterials (CORAL). Finally, a business plan will be elaborated for the commercialization of PeptiCaps nanocapsules for all cosmetic applications as well as other markets (dermatology and food) to ensure full exploitation of the PeptiCaps technology.

FOLSMART

Project ID: 683356 **Funded under:**
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.3. - Developing the societal dimension of nanotechnology
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Folate-Target Nanodevices To Activated Macrophages For Rheumatoid Arthritis

From 2016-01-01 **to** 2019-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 993 833,75	NMP-06-2015 - Novel nanomatrices and nanocapsules
EU contribution:	**Call for proposal:**
EUR 4 993 833,75	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Portugal	RIA - Research and Innovation action

Objective

FOLSMART will bring to phase I clinical trials novel folate-based nanodevices (FBN) for the treatment of rheumatoid arthritis (RA). These nanodevices for folic acid (FA)-mediated targeting of activated macrophages showed improved clinical scores in a mouse model of RA when compared to methotrexate (MTX), a first-line drug therapy for the treatment of RA. In this way, FBN will be benchmarked against this drug. MTX has significant associated toxicity and second line biological therapies poses a great economic burden to hospital/public health systems. In parallel, nanodevices encapsulating Sulfasalazine (SSZ), will be tested. SSZ is a second line indication for the treatment of RA, unresponsive to MTX or MTX-intolerant patients. Furthermore, FOLSMART propose the optimization of mechanisms for the release of the drugs, through pH and temperature sensitive nanodevices. An exploitation and business plans will be elaborated. In parallel, initial economic evaluation of all proposed treatments will be performed to validate these claims.

Specific technological objectives of FOLSMART will be:

Good Manufacturing Practice (GMP) production of the FBN based therapies which have been positively bench-marked in the previous FP7 European project NANOFOL in comparison with the use of MTX in a RA mouse model:
-Liposomal MTX and SSZ with FA-"neck domain" peptide as targeting agent -Nanoparticles from HSA-FA/MTX conjugates and SSZ

-Optimization of mechanisms of drug release and application to other fields Pre-clinical development on RA

models
-Toxicology and pharmacokinetics, to determine tolerability and efficacy benefit in two animal models rat and dog, under Good Laboratory Practice (GLP) standards -Genotoxicity and Carcinogenicity

Phase I clinical trials of the best therapies bench marketed against MTX
-Nanodevices with MTX and SSZ will offer improved tolerance and greater efficacy meaning that patients who do not do well on MTX will have cost-effective alternatives

MOZART

Project ID: 685872 F**unded under:**
H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.3. - Developing the societal dimension of nanotechnology
H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

MesopOrous matrices for localized pH-triggered releAse of theRapeuTic ions and drugs

From 2015-11-01 **to** 2019-10-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 651 228,75	NMP-06-2015 - Novel nanomatrices and nanocapsules
EU contribution:	**Call for proposal:**
EUR 4 651 228,75	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Italy	RIA - Research and Innovation action

Objective

The concept behind MOZART is to develop a library of inorganic nanomatrices to be used as smart platforms for effective, non-invasive and highly targeted therapies. MOZART will address, as proof of concept, nanomatrices to treat delayed bone healing and non-healing chronic skin wounds, which are both characterised by an inflammation and often infection. Mesoporous therapeutic glasses (MTGs), doped with selected ions (e.g. Ag+, Li+, Cu2+, Sr2+, Ce3+, B3+) and having nanopores of adjustable size within 2-50 nm, will be synthesised and then loaded with the chosen payload. Ordered mesoporous carbons (OMCs) will also be manufactured to host a wide range of biomolecules and higher payload. As in an orchestra, where the integration among the different participants allows a harmonious symphony to be created, in MOZART the synergistic release of ions and drugs will be directed to achieve a radically improved therapeutic effect. The exploitation of the response of self-immolative polymer coatings upon pH changes will be used as an elegant and effective way for triggering the payload release. The (coated) nanomatrices will be incorporated in a thermosensitive gel that is liquid at room temperature and undergoes sol-gel transition in the physiological environment. These gels are perfect candidates to develop non-invasive procedures to introduce MOZART nanomatrices to the pathological site and keep them in place for the required time. Clinical and societal impacts of MOZART will be enormous, considering the extraordinarily high number of pathological cases potentially involved. Only in ELI, 350 000 patients per year are affected by non-union bone fractures and 2.2 million people suffer from chronic wounds. We expect that MOZART approaches will significantly reduce the healing time of non-union bone fractures (within 4 months vs. a minimum of 12 months) and will allow at least 50% of people suffering from chronic wounds to heal fully.

FAST

Project ID: 685825 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Functionally graded Additive Manufacturing scaffolds by hybrid manufacturing

From 2015-12-01 **to** 2019-11-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 916 750	NMP-07-2015 - Additive manufacturing for tabletop nanofactories
EU contribution:	**Call for proposal:**
EUR 4 916 750	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Netherlands	RIA - Research and Innovation action

Objective

Additive Manufacturing (AM) market has grown with trends higher than 20% every year in the last 10 years. Their fast uptake is due to different innovative factors such as no shape limits in manufacturing process, full customisation on the single artefact, localised production and no waste material. In particular the ability to print any shape allows to design the products not following the constricting conventional manufacturing processes but just focalising on their function. This "Design for Function" feature is one of the main drivers for AM uptake on a wider scale production and the limited number of "functional" materials that can be printed or the limit in controlling gradient and surface properties are showing to be an important barrier. This is particularly true in manufacturing of tissue engineering (TE) scaffolds where the technology has a promising growth over the last decade. Scaffolds production for tissue regeneration is one of the main fields where the "Design for Function" feature of AM make the difference relative to the other production techniques if in the production process all the needed "Functions" can be introduced: mechanics, geometry (porosity and shape), biomaterial, bio-active molecules and surface chemical groups.
The FAST project aims to integrate all these "Functions" in the single AM process.
This integration will be obtained by the hybridisation of the 3D polymer printing with melt compounding of nanocomposites with bio-functionalised fillers directly in the printing head and atmospheric plasma technologies during the printing process itself. Final objective of the project is to realize a demonstrator of the proposed hybrid AM technology in order to achieve a small pilot production of scaffolds for bone regeneration with the novel smart features to be tested in some in-vivo trials.

DIMAP

Project ID: 685937 **Funded under:**
H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Novel nanoparticle enhanced Digital Materials for 3D Printing and their application shown for the robotic and electronic industry

From 2015-10-01 **to** 2018-09-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 997 351,25	NMP-07-2015 - Additive manufacturing for tabletop nanofactories
EU contribution:	**Call for proposal:**
EUR 4 997 351,25	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Austria	RIA - Research and Innovation action

Objective

The here proposed DIMAP project focuses on the development of novel ink materials for 3D multi-material printing by Polyjet technology. We will advance the state-of-the art of AM through modifications of their fundamental material properties by mainly using nanoscale material enhanced inks. This widens the range of current available AM materials and implements functionalities in final objects. Therefore applications will not be limited to rapid prototyping but can be used directly in production processes. DIMAP will show this transition in two selected application fields: the production soft robotic arms/joints and customized luminaires. In order to cope with these new material classes the existing Polyjet technology is further developed and therefore improved. The DIMAP project targets at the following objectives: additive manufactured joints, additive manufactured luminaires, ceramic enhanced materials, electrically conducting materials, light-weight polymeric materials, high-strength polymeric materials, novel multi-material 3D-printer and safe by design. With the development of novel ink materials based on nanotechnology improvement of the mechanical properties (ceramic enhanced and high-strength polymeric inks), the electrical conductivity (metal enhanced inks) and the weightiness (light weight polymeric materials) are achieved. Based on the voxel printing by Polyjet these new materials lead to a huge broadening of the range of available digital material combinations. Further focus points during the material and printer development are safe by design approaches, work place safety, risk assessment, collaboration with ELI safety cluster and life cycle assessment. An established roadmap at the end of project enables the identification of future development needs in related fields order to allow Europe also in the future to compete at the forefront of the additive manufacturing revolution.

NANOTUN3D

Project ID: 685952 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies H2020-EU.2.1.2.1. - Developing next generation nanomaterials, nanodevices and nanosystems H2020-EU.2.1.2.2. - Ensuring the safe and sustainable development and application of nanotechnologies H2020-EU.2.1.2.5. - Developing and standardisation of capacity-enhancing techniques, measuring methods and equipment

Development of the complete workflow for producing and using a novel nanomodified Ti-based alloy for additive manufacturing in special applications.

From 2015-10-01 **to** 2019-03-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 936 657,2	NMP-07-2015 - Additive manufacturing for tabletop nanofactories
EU contribution:	**Call for proposal:**
EUR 2 936 656,25	H2020-NMP-PILOTS-2015 See other projects for this call
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

NANONTUN3D will take advantage of the possibilities of Additive Manufacturing (AM) together with the development of a specially tailored Ti- based nano-aditived material to achieve dramatic improvements in structural parts of aero, space, mobility, and equipment sectors, reaching expected savings between 40% and 50% of material in critical applications, inherent benefits of AM will be kept (decrease in throughput times, tool-less production, high buy-to-fly-run ratios, etc.). By adding nano-particles (np) to metal matrixes, the whole life cycle of the NANOTUN3D material has been designed with AM processability in mind: safety and handling issues, processing in well-known AM technologies, postprocessing and eventual certification issues are dealt with, and innovative core-shell treatment of the nano-particles that suits the Ti matrix and produces Ti64-like powder ready to be AM processed. A whole Health, Safety and Environmental (HSE) management system will also be developed, as well as all the protocols to start qualification/certification of material and process.

PROTECT

Project ID: 720851 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies

Pre-commercial lines for production of surface nanostructured antimicrobial and anti-biofilm textiles, medical devices and water treatment membranes

From 2017-01-01 **to** 2020-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 9 441 862,5	PILOTS-02-2016 - Pilot Line Manufacturing of Nanostructured Antimicrobial Surfaces using Advanced Nanosurface Functionalization Technologies
EU contribution:	
EUR 7 478 985	**Funding scheme:**
Coordinated in:	IA - Innovation action
Spain	

Objective

PROTECT aims to introduce to the market One step antimicrobial finish processes for polymeric materials used in i) specialty textiles for public areas and hospitals, ii) water treatment membranes, and iii) implantable medical devices. Compared to main existing manufacturing routes, the proposed one-step coating technologies are simple, fast, and reproducible. For this, PROTECT uses as a starting point four existing pilot lines emanated from high successful FP7 projects SONO, NOVO and BioElectricSurface. PROTECT will upgrade the nanocoating One step process platform comprising: two roll to roll (R2R) pilots (sonochemical and spray coating) for functional textiles production, a R2R thermoembedding pilot for antibacterial/biofilm preventing water treatment membranes, and a batch sonochemical pilot for antibacterial/antibiofilm/biocompatible medical devices. This platform will cover a wide range of applications due to their specific characteristics by the following objectives:
a) Incorporating 'antibacterial antibiofilm biocompatible novel nanoparticles'(NPs) of the following categories: inorganic (CuxZnl-xO ,5 Ga@C-dots, SÍ/TÍ02 composite) polymer (polypyrrole, PPy)) and biologicals (antibacterial enzymes, functionalized lipids (FSLs), hybrid antibacterials) to obtain 'biocompatible nanostructured surfaces with antimicrobial and anti-adhesive' properties.
b) Implementing real time characterization methods for monitoring at the nanoscale to characterise relevant materials, process properties and product features for 'real-time nanoscale characterization' to ensure 'reproducibility' and 'quality' of the nano-coated products
c) Improving 'coating efficiency, production capacity, reproducibility, robustness, cost-effectiveness, safety and sustainability' of the processes in relation to the targeted applications.
d) Introducing a Labs Network (PLN) that will include also lab scale processes of the proposed technologies for 'training and knowledge dissemination.

NECOMADA

Project ID: 720897 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies

Nano-Enabled Conducting Materials Accelerating Device Applicability

From 2017-01-01 **to** 2019-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 101 378,75	PILOTS-01-2016 - Pilot lines for manufacturing of materials with customized thermal/electrical conductivity properties
EU contribution:	**Funding scheme:**
EUR 6 820 288,75	IA - Innovation action
Coordinated in:	
United Kingdom	

Objective

The project targets the incorporation of advanced functional materials to deliver customised conductive inks and flexible adhesives compatible with high volume manufacturing platforms. Specifically the development of these enabling materials will support high speed roll to roll integration of hybrid and large area electronics to address internet of things opportunities.
The consortium will integrate materials development with end application requirements in terms of technical performance (thermal/electrical conductivity, processing conditions, materials integrity and adhesion) and unit cost of production to facilitate market adoption. The project will utilise and build on existing CPI pilot facilities (R2R print line) to demonstrate technology integration, manufacturability and produce components for end user evaluation to enable the direct comparison of production techniques.
The project delivers a supply chain to support future commercialisation: incorporating materials suppliers of inks and adhesives, supporting RTO in Formulation and nano-particle production, established high fidelity print equipment manufacturers, electronic device manufacturers, established pilot line facilities and potential end users from the apparel, packaging and healthcare sector - relating to the internet of things.

NanoPack

Project ID: 720815 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies

Pilot line production of functional polymer nanocomposites from natural halloysite nanotubes: demonstrating controlled release of active antimicrobials in food packaging applications.

From 2017-01-01 **to** 2019-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 799 793,75	PILOTS-02-2016 - Pilot Line Manufacturing of Nanostructured Antimicrobial Surfaces using Advanced Nanosurface Functionalization Technologies
EU contribution:	
EUR 7 665 218	**Funding scheme:**
Coordinated in:	IA - Innovation action
Israel	

Objective

"NanoPack will demonstrate a solution for extending food shelf life by using novel smart antimicrobial surfaces, applied in active food packaging products. It will run pilot lines in operational industrial environments to manufacture commercially feasible antimicrobial polymer films, accepted by consumers. It will minimize the amount of preservatives required to maintain freshness, add value and assure safety to the entire supply chain. The project will employ natural Halloysite Nanotubes (HNTs) as reliable and safe carriers of bio-active compounds which are unable to migrate from the food packaging into food. Maximising safety, they slowly release minute amounts of potent, volatile and broad-spectrum natural agents into the packaging headspace. Using nanotechnology enables 1) introducing sensitive molecules into polymer films; 2) anti-microbial functionality without impaired film properties; 3) manufacturing potent antimicrobial surfaces with tunable properties, while creating a pH-triggered "gate keeper" effect to slow down release of the payload encapsulated. The resulting film will exhibit antimicrobial properties unmet by the current state-of-the-art.

The processes across the supply chain will be validated through 5 pilot runs on existing production lines: 1) loading antimicrobials, 2) anti-microbial HNT polymer production, 3) anti-microbial packaging film production and 4-5) using the novel packaging on food products. Commercial feasibility will be assessed, including consumer acceptance and legal, regulatory, safety and environmental aspects.

The success of NanoPack will result in validated consumer-accepted nanotechnology-based antimicrobial food packaging that will enhance food safety, prevent foodborne illness outbreaks and reduce food waste caused by early spoilage. Better performing, safer and 'smarter' products will position Europe as the leader in food nanotechnology & smart antimicrobial packaging while increasing competitiveness and industry growth."

FLEXPOL

Project ID: 721062 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies

Antimicrobial FLEXible POLymers for its use in hospital environments

From 2017-01-01 **to** 2019-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 5 677 717,08	PILOTS-02-2016 - Pilot Line Manufacturing of Nanostructured Antimicrobial Surfaces using Advanced Nanosurface Functionalization Technologies
EU contribution:	
EUR 5 171 943,34	**Funding scheme:**
Coordinated in:	IA - Innovation action
Germany	

Objective

FLEXPOL aims to develop a pilot line for the production of a cost effective antimicrobial (AM) adhesive film for its use in hospitals.
The obtained adhesive film will inhibit growth of a wide range of microbes and will be suitable for high-touch surfaces, providing a durable protection with good resistance. It will assure the highest level of hygiene and patient safety, reducing the use of disinfectants.
These objectives will be achieved, using a multi-functional approach combining prevention of adhesion with killing of microorganisms, by means of essential oil (EO) emulsions embedded in a micro and nanopatterned polypropylene matrix.
FLEXPOL covers the following key aspects:
-It addresses the development, upscaling and demonstration in a relevant industrial environment of the production of films with AM, biocompatible and anti-adhesive properties. Existing extrusion and nanoimprinting pilot lines will act as the starting point in which new additives based on blends of EO will be incorporated.
-Previously validated technologies constitute the basis of the approach. These technologies will be extended to large scale production and demonstrated in a real operational environment. The pilot line will include real time characterization for inspection of the film at the nanoscale.
-Robustness and repeatability of film fabrication and its behavior in a real environment will be studied. The effectiveness of the solution will be compared with standard protocols.
-Materials are chosen according to their cost for large-scale application. Productivity and cost of the fabrication process will be analyzed attending to energetic optimization of the product fabrication and the raw material cost.
-Access to the pilot line for AM films in this or a different application will be ensured to European Industries at a cost that promotes technology transfer.
-Non-technological aspects key for the marketing of the product (such as regulatory issues, HSE aspects, LCA...) are considered.

INTEGRAL

Project ID: 720878 **Funded under:**
H2020-EU.2.1.2. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Nanotechnologies

INitiative to bring the 2nd generation of ThermoElectric Generators into industrial ReALity

From 2016-12-01 **to** 2019-11-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 8 845 948,75	PILOTS-01-2016 - Pilot lines for manufacturing of materials with customized thermal/electrical conductivity properties
EU contribution:	**Funding scheme:**
EUR 7 000 983,51	IA - Innovation action
Coordinated in:	
France	

Objective

Thermoelectric materials have been studied for several decades now. Improved TE materials are emerging with the so-called second-generation thermoelectric (GEN2 TE) materials: silicides and half-Heusler. These materials are low- cost, based on most earth-abundant elements and eco-friendly materials, and can impact positively European industry and society by converting wasted heat into electricity.
As GEN2 TE materials are attracting a growing interest, pilot lines resulting from partnerships between public research institutes, industrial research teams and SME are emerging in Europe.
The aim of the INTEGRAL project is to upscale the GEN2 TE material technology using existing pilot lines and growing SMEs, in order to address mass markets TE needs (automotive, heavy duty trucks, autonomous sensors and industry waste heat recovery). The INTEGRAL project is unique since it gathers in a complete value chain the major companies (including SMEs and startups) developing GEN2 TE advanced materials in Europe and cutting-edge research centers. INTEGRAL will allow the industry to step up towards advanced manufacturing and commercialization of systems integrating multifunctional TE materials (on a nano-based approach), through material customization, next techniques for characterization and process control and up-scaled pilot-line demonstrations of reliability, reproducibility and mastered material consumption. Furthermore, the large-scale processes which will be developed for producing nanostructured materials within the INTEGRAL project will explore a wider range of applications outside thermoelectrics, in particular where customization of electrical or thermal properties of sintered or casted materials are needed. Finally, a technology transfer will be performed from research activities to pilot-lines, towards the commercialization of the new generation of advanced materials with a circular economy vision.