

(d) Advanced materials and nanotechnologies for high added value products and process industries

Year	Topic Title	Instrum ent	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	<p>Novel (covalently cross-linked hybrid) materials for the use in heterogeneous catalysis</p> <p>Heterogeneous catalysis is of paramount importance in many areas of the chemical and energy industries. The focus of the topic is in the design of hybrid, organic –inorganic catalyst materials for improved performance, including recovery and re-use of the catalyst.</p> <p>The primary source of this topic is ERIC association, which stands for European research institute for catalysis. It is a virtual institute which was established as a follow-up activity for a catalysis Network of Excellence IDECAT.</p>	RIA	4-6	Source: nanocatalysis cluster + ERIC association, a virtual institute which was established as a follow-up activity for a catalysis Network of Excellence IDECAT.			
	<p>Materials for power electronics</p> <p>New cost-effective materials, architectures, technologies, and processes are crucial for the next generation power electronics. Power electronics is a key value chain component in many industries, such as automotive, energy transmission and generation and industrial electronics.</p> <p>The focus of the topic would be in the development of wide band gap materials with improved operational characteristics. We are currently discussing with DG CNECT and the ECSEL joint undertaking if they would support the more downstream activities in relation to the device design and packaging and the manufacturing process.</p>	RIA	4-6	Source: European Association of power electronics; International cooperation; Coord. call to be discussed with DG CNECT/ECSEL			
	<p>Innovative and sustainable materials solutions for the substitution of critical raw materials in the electric power system</p> <p>Many advanced technologies driving the electric power system crucially depend on CRM. The topic focuses on materials substitution in magnets; batteries; catalysts and photovoltaic materials. We have been developing INCO with the US and Japan in particular, so INCO will be encouraged in this topic.</p>	RIA	4-6	Source: EIP raw materials; Priority Area "Substitution of raw materials"; To be discussed with DG GROW. Possible support for international cooperation			
	<p>Affordable weight reduction of high-volume vehicles and components taking into account the entire life-cycle</p> <p>We have an agreement to support GV with one topic every two years.</p> <p>European Council conclusions of March 2014 prioritised batteries for electro-mobility but we have two new projects on post Li-Ion entering GAP in February, so we propose to focus the next topic on lightweight materials, in particular low density/high strength and highly formable materials (steels, alloys, polymers, reinforcements) and their combination (composites, sandwiches)</p>	RIA	4-6	Source: cPPP Green vehicles			
	<p>Architected /Advanced material concepts for intelligent bulk structures</p> <p>The Council conclusions also prioritised intelligent materials and we propose a topic on intelligent structures and components that provide information of their in-service condition. Examples already exist in aerospace and automotive sectors but there are several concepts that have not yet been demonstrated in large scale industrial applications and infrastructure.</p>	RIA	4-6	Source: EuMat; Metallurgy roadmap			
	<p>Creative Industries: Design-driven advanced materials for high added value innovative products</p> <p>The input received in the LET's Creative industries session was that it is important to consider design input early in technological development especially in topics dealing with new products for commercial or societal applications or user-centred production processes like 3D printing, so the topic is about using design as a strategic tool to create innovative products and services.</p>	IA	5-7	Source: Support for creative industries is highlighted among the materials bulletpoints in the H2020 specific programme: LET's Bologna conference feedback; SME supportive + SSH			

2017	<p>Improved materials durability</p> <p>Our plan is to target this materials durability towards buildings and infrastructures, including offshore, thereby providing support for the Blue Growth focus area. Apart from the development and validation of more durable materials proposals should develop non-destructive inspection procedures and monitoring tools as well as develop theoretical understanding of the factors which affect durability of materials.</p>	RIA	4-6	Source: EnB; EuMat; Multisectoral, including Blue Growth support			
	<p>Characterisation platform of laboratories with test facilities and experimental protocols for materials, including model validation</p> <p>The analysis of the three-dimensional structure, properties and functions of nanomaterials with a high level of precision poses a big challenge. There is the need for a knowledge platform enabling designers and producers to choose the optimal characterisation technology .</p> <p>There is a need for coordination and optimisation of existing measurement tools and technologies and this requires a platform of laboratories with test facilities and experimental protocols for materials.</p> <p>There is a need to develop advanced measurement capability to develop new testing strategies adapted to a high number of nanomaterials or resolve the structure of surfaces at an acceptable speed.</p>	RIA	4-6	Source: Characterisation cluster; To be discussed with infrastructures programme (one project)			

(e) Key enabling technologies for societal challenges - healthcare

Year	Topic Title	Instrument	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	<p>Biomaterials for treatment and prevention of multiple sclerosis</p> <p>The aim of this topic is to develop innovative approaches for biomaterials for health that are easily transferable from industry to the clinic and based on new methodologies directed to the improvement of the treatment and prognosis of multiple sclerosis, where regrowth and regeneration of affected areas of the nervous system is the key to successful therapy.</p>	RIA	4-6	Source: Biomaterials roadmap			
	<p>Nanoformulation of biologicals</p> <p>This topic focuses on the formulation of nanocarriers containing biomolecules. Many biomolecules (e.g. proteins, peptides, nucleic acid) have demonstrated interesting activities in vitro. However, in pre-clinical in vivo development, they show disappointing loss of efficacy and/or unacceptable toxicity. For example, the biomolecule may be processed by the immune system or enzymes of the host before reaching its targeted tissue. Nanotechnology represents a promising opportunity to overcome these drawbacks.</p>	RIA	4-6	Source: NanoMedicine white paper & roadmap			
2017	<p>Reference methods for managing the risk of engineered Biomaterials</p> <p>This topic focuses on the comparison and validation of current (and/or development of new) test methods and test schemes, including in vitro and in silico methods, to detect adverse effects from biomaterials to human health and the environment. Projects are expected to initiate and support standardisation of the proposed biomaterials and methods, including methods that will reflect their eventual deployment as part of Advanced Therapy Medicinal Products or Medical Devices.</p>	RIA	4-6	Source: Biomaterials roadmap			
	<p>Upscaling of the production of nanopharmaceuticals</p> <p>This topic would be a repeat of the 2014 upscaling topic. Our objective was to establish an ecosystem of GMP facilities for nanopharmaceuticals industry in Europe. Three projects is a good start but it is not an ecosystem yet. Many good initiatives exist out there and the new ENATRANS CSA resulting from the 2014 call, which supports the identification of new nanopharmaceuticals is going to create new needs for the manufacturing of these pharmaceuticals.</p>	RIA	4-6	Source: NanoMedicine white paper & roadmap; SME supportive			
	<p>Nanotechnologies for imaging cellular transplants and regenerative processes in vivo</p> <p>Detection and monitoring of cell transplants in vivo is of utmost importance for development of clinical cell therapy. Suitable nanotechnology-based imaging approaches with high sensitivity should allow for monitoring of cell viability, engraftment and distribution. Appropriate imaging techniques have been developed for application in small animals, but are not available yet for use in preclinical large animal models and patients.</p>	RIA	4-6	Source: NanoMedicine white paper & roadmap			
	<p>Mobilising the European nano-biomedical ecosystem</p> <p>This Coordination Action would be supporting the development of an ecosystem for Nanomedicine in Europe, including activities such as coordinating national platforms and regional clusters; developing common training material and services; international cooperation related to community building, road-mapping, and tackle issues such as regulation, reimbursement and pricing and standardization.</p>	CSA		Source: NanoMedicine white paper & roadmap; SME supportive			
	<p>ERA-NET on Nanomedicine (Call 2017)</p> <p>This proposed COFUND action would be continuing the activities started by EuroNanoMed</p>	Eranet		Source: NanoMedicine white paper & roadmap; Eranet COFUND			

(e) Key enabling technologies for societal challenges – energy

Year	Topic Title	Instrument	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	Advanced materials solutions and architectures for high efficiency solar energy harvesting Proposals should deliver novel very high efficiency solar (PV or CSP) technologies, to enhance system conversion efficiencies, while preserving lifetime and low materials consumption. There are many emerging technologies and materials out there at low TRL levels. These emerging technologies need to demonstrate their added value in terms of performance or unique application options and their viability in terms of manufacturability, yield and stability.	RIA	4-6	Source: IDI - Materials for energy			
	Advanced materials enabling the integration of storage technologies in the electricity grid Reliable access to cost-effective electricity is the backbone of the EU economy, and energy storage is an integral element in this system. This topic addresses the development of advanced functional particles, filaments, layers, coatings and new functionalities, to facilitate the integration of storage devices in the electrical grid including for example materials for high capacity cables and super conductors, high voltage cables and accessories to 1000 kV, materials for medium voltage and smart electrical accessories.	IA	5-7	Source: IDI - Materials for energy			
2017	Cost-effective materials for "power to chemical" technologies Chemical energy storage involves the transformation of electrical energy into chemical energy carriers. The topic tackles the development of new materials and chemistries to store energy either as hydrogen or more complex chemicals such as syngas or synfuels.	RIA	4-6	Source: IDI - Materials for energy			
	High-performance materials for optimising CO2 capture Over recent years, promising new material solutions which could dramatically improve the efficiency of CO2 capture while lowering the cost, have been under development. Such solutions involved, inter alia, nanostructured hybrid materials, membranes, solid and liquid-based adsorbents. This topic calls for the demonstration of the performance and price competitiveness of such new developments under realistic conditions.	IA	5-7	Source: IDI - Materials for energy			

Knowledge-based nanotechnologies and advanced materials for industrial value chains

Year	Topic Title	Instrument	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	<p>Pilot lines for manufacturing of materials with customized thermal/electrical conductivity properties</p> <p>Advanced functional materials with customized thermal/electrical conductivity properties provide new opportunities for a wide range of applications, in particular in areas like electrical and electronics, energy and power, automotive and aerospace (e.g. capacitors, skins of aircrafts for lightning protection, thermal layers, to mention only a few).</p> <p>The aim is to reduce the cost of these materials and their production, and establish process control and characterization approaches for an industrial production.</p>	IA	5-7	Source: Nanofutures roadmap; SME supportive; cross-cutting KETs			
	<p>Reactive/In Situ /In process generation of nano-features</p> <p>The idea of this topic is to utilize materials that are able to develop their nano-functionalities during the standard process of product and semifinished product manufacturing. Examples of such materials include plastics additives that crystallize in nanoparticle during injection moulding, metal phases that are formed during forging, or hierarchic structures that spontaneously form during application of a coating. The possibility to obtain the nano features directly during the manufacturing process strongly reduces the safety issues related to the use of free nanoparticles contributing to a safe utilization of nanomaterials.</p>	IA	5-7	Source: Nanofutures roadmap; SME supportive; cross-cutting KETs			
	<p>Open access Pilot Lines for advanced nanosurfaces and surface functionalization technologies enabling breakthrough applications</p> <p>The open access pilot line concept for nanocomposites was well received and now we plan to have a similar approach for a topic tackling a different value chain, in this case nanosurfaces and surface functionalisation.</p>	RIA	4-6	Source: Nanofutures roadmap; SME supportive; cross-cutting KETs			
2017	<p>Enhanced performance of functional nanocoatings</p> <p>This pilot line would tackle functional nanocoatings, which have a huge potential for many sectors. We still need to decide whether we wish to focus on a specific application field, like highly mechanical resistant coatings, antimicrobial applications or self-cleaning surfaces.</p>	IA	5-7	Source: Nanofutures roadmap; SME supportive; cross-cutting KETs			
	<p>Open access Pilot Lines for 3D printed and/or injection moulded polymeric microfluidic MEMS</p> <p>Microfluidics devices were initially based on non-polymeric materials like silicon or glass, manufactured in facilities developed for the semiconductor industry. New fabrication techniques that are completely based on polymer /plastic materials can lead to reducing fabrication costs and optimise time, including rapid prototyping methods for a new range of products. This topic targets the development of a new generation of 3D printed and/or injection moulded polymeric microfluidic MEMS products.</p>	RIA	4-6	Source: Nanofutures roadmap; SME supportive; cross-cutting KETs; Follow-up for the nano/microfluidic CSA topic in 2015 WP			
	<p>Paper electronics / Bio-based Packaging/New generation bio-based materials (working title)</p> <p>Paper-based electronics shows promising technical, economic, and environmental advantages which will allow new disposable electronics devices, like paper displays, smart labels, smart packaging, bio-applications, RFID tags, among others. This topic addresses the engineering challenges linked with the use of paper as substrate as well as active components of the electronic devices</p>	RIA	4-6	Source: Forest based ETP; SME supportive; cross-cutting KETs; Follows-up work done in FP7 on nano-cellulose & intelligent packaging			

(h) Actions to support developments in, and acceptance of, nanotechnologies, advanced materials and biotechnology - modelling

Year	Topic Title	Instrument	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	<p>Advancing the integration of Materials Modelling in Business Processes to enhance effective industrial decision making and increase competitiveness</p> <p>Materials modelling, including smart algorithm development, is a leading and globally recognized competency for Europe. The use of materials modeling in industrial decision making requires that models provide results which are validated in the operational practice. These models also need to be integrated with business decision approaches to enhance effective decision making. The aim of the topic is the development of an integrated Business Decision Support System (BDSS) that helps to choose the relevant models for new materials and new processes. and answer questions like: What is the optimal material and process: How much does a specific solution cost?</p>	RIA	4-6	Source: European Materials Modeling Council			
	<p>Network to capitalise on strong European position in materials modelling and to allow industry to reap the benefits</p> <p>The materials modelling community consists of many stakeholders (manufacturers/end-users, electronic/atomistic/mesosopic/continuum modellers (reference to Review on Materials Modelling), open source/proprietary software owners, service providers etc). The proposed coordination and support action should bring stakeholders together in order to allow industry to reap the benefit of materials modelling. The translation of industrial problems into material problems that can be solved by computational simulation should be facilitated and networking of stakeholders who can take up this role is to be established.</p>	CSA		Source: European Materials Modeling Council			
2017	<p>Next generation system integrating tangible and intangible materials model components to support innovation in industry</p> <p>The explosion of the number of materials models makes it difficult to find the right tool for the job. In particular the industry needs education and support by translators analysing the industrial problems and proposing modelling solutions to the companies requesting this. There is a need to provide integrated solutions for customer-driven materials modelling and to improve the inter-operability of software.</p> <p>The topic also aims at the establishment of a market place that links the various activities, communities, data, models, information on simulation tools into a coherent system.</p>	IA	5-7	Source: European Materials Modeling Council			

(h)- science-based risk assessment and management

Year	Topic Title	Instrum ent	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	<p>Analytical tools in support of nanosafety risk assessment Thorough physico-chemical characterisation of nanomaterials is essential for sound assessment of their biological and environmental properties. However, suitable analytical techniques and equipment, skilful operators, and inter-laboratory studies are often lacking even for the "simple" case of particle size distribution. Hence this topic aims at the development of relevant analytical methods and corresponding equipment that enable characterisation of ensembles of nanomaterials size, shape, surface and multiple composition.</p>	RIA	4-6	Source: Nano-safety cluster strategic research agenda; Relevant for International Cooperation			
	<p>Promoting safe innovation through consolidation and networking of nanosafety centres A wide variety of national and (EU) regional platforms and centres exist which are dedicated to research, market follow-up, dissemination of nanosafety. There is the need to consolidate and further develop these first initiatives so as to make available to industry and other stakeholders an European-wide, up-to-date, science-based, complete system capable of managing risks in the field and providing scientific support to more general questions on product quality, technical approvals, and counterfeiting, training and certification system for nanosafety at work. The proposed CSA should aim at networking these platforms at European level, including the nanosafety cluster.</p>	CSA		Source: Nano-safety cluster strategic research agenda; Relevant for International Cooperation			
2017	<p>Framework and strategies for nanomaterial characterisation, classification, grouping and read-across for risk analysis The number of available nanomaterials is growing rapidly and testing each material thoroughly is virtually impossible. The idea of this topic is to support classification and grouping of nanomaterials for further risk analysis, to help in developing intelligent testing strategies and identifying "nanomaterials or properties of concern" that need to be tested more thoroughly.</p>	RIA	4-6	Source: Nano-safety cluster strategic research agenda; Relevant for International Cooperation (one project)			
	<p>Advanced and realistic models for nanomaterial toxicity testing For establishing intelligent testing strategies for nanomaterials it is of high priority to develop and adopt realistic and advanced in vitro models. Current in vitro experiments mostly rely on established immortalized cell lines, which often do not reflect the in vivo situation, so the aim of this topic is to develop more realistic more realistic in vitro models</p>	RIA	4-6	Source: Nano-safety cluster strategic research agenda; Relevant for International Cooperation (one large project)			

(h) – innovative and responsible governance

Year	Topic Title	Instrument	TRL	Comments	HLG comments on proposed TRL	HLG comments on the proposed scope	HLG priority for the topic (1-5; 1 very low priority; 5 very high priority)
2016	Improving nanotechnology (KETs) skills by involving multiple stakeholders The topic aims at improving nanotechnology education and skills by promoting integrated efforts between three stakeholder groups: industries, universities and secondary schools. It focuses on the identification of best practice examples , including information platforms, on-line and hands-on teaching modules, and assessment tools for current and novel education activities.	CSA		Source: Feedback from existing FP7 portfolio; SSH			
2017	Governing innovation of nanotechnology through enhanced societal engagement The proposed action should follow-up on previous FP7 nanotechnology projects in the field of societal engagement and address the governance of innovation and implementation of Responsible Research & Innovation (RRI) through multi-stakeholder pilot projects that will focus on concrete product development at an early stage in order to consider the ways that nanotechnologies can help to address societal challenges and to consider needs and concerns.	CSA		Source: Feedback from existing FP7 portfolio; SSH			
	Innovative solutions for the conservation and preservation of (contemporary) cultural heritage Projects should develop one or more solutions (functional materials or techniques) with high innovation potential for the restoration or preventive conservation of tangible CH and to use advanced techniques, such as multi-scale modelling approaches to address the effect of the proposed solutions. The proposed materials/techniques are expected to ensure long term protection and security of cultural heritage, taking into account environmental and human risk factors.	RIA	4-6	CH included in the SSH specific programme; 1 topic every 2 years; input from the characterisation/ modeling cluster			