



#InvestEUresearch



# Horizon 2020 Work Programme for Research & Innovation 2018-2020

*H2020 2019-2020  
D3 Topics  
(2020 topics only  
tentative)*

Søren BØWADT-Deputy Head of Unit  
Advanced Materials and Nanotechnologies  
DG Research & Innovation – Industrial Technologies

**SusChem Brokerage  
23 October 2018**

Research and  
Innovation

# H2020 2019-2020 D3 Topics (2020 topics only tentative)

Publication 25 July 2018 (2019 update)  
2019 Deadlines

Two-stage topics: 22 January 2019 (first stage) and 3 September 2019 (2<sup>nd</sup> stage)

Single-stage topics: 21 February 2019

# FOUNDATIONS FOR TOMORROW'S INDUSTRY

## Open Innovation Test beds (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>DT-NMBP-03-2019 Open Innovation Test Beds for nano-enabled surfaces and membranes</b>	<b>2019</b>	<b>IA</b>
<b>DT-NMBP-04-2020 Open Innovation Test Beds for nano-enabled biobased materials and solutions</b>	<b>2020</b>	<b>IA</b>
<b>DT-NMBP-05-2020 Open Innovation Test Beds for functional materials for building envelopes</b>	<b>2020</b>	<b>IA</b>
<b>DT-NMBP-06-2020 Open Innovation Test Beds for nano-pharmaceuticals production</b>	<b>2020</b>	<b>IA</b>



# DT-NMBP-03-2019: Open Innovation Test Beds for nano-enabled surfaces and membranes (IA)

From TRL  
4 to 7!

## Specific Challenge:

**Establish facilities for cost effective and sustainable industrial upscaling and deployment. Integrate state-of-the-art nano-scale processes for modification, functionalisation, and structuring/coating of surfaces or membranes.**

## Scope:

**Upscale materials facilities and processing techniques. Demonstrate in relevant industrial environments. Provide "turn-key" upscaling services. Available to industry through open access at fair conditions and cost. Cooperation with others along the value chain, incl. outreach and dissemination across the EU**

## Expected impact:

**Open, upgraded, accessible facilities, attract +20% new SME users, additional 4\*turnover in 5 years, improved processes and industrial productivity, reliability, environmental performance (energy), durability and life-cycle costs. Verified and providing increased access to finance!**

# FOUNDATIONS FOR TOMORROW'S INDUSTRY

## Materials Characterization and Computational Modelling (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>DT-NMBP-08-2019: Real-time nano-characterisation technologies</b>	<b>2019</b>	<b>RIA</b>
<b>DT-NMBP-10-2019: Adopting Materials modelling in manufacturing processes</b>	<b>2019</b>	<b>RIA</b>
<b>DT-NMBP-12-2019: Sustainable Nano-Fabrication</b>	<b>2019</b>	<b>CSA</b>
<b>NMBP-xx-2020: Towards Harmonised Characterisation Methodologies and Data Formats</b>	<b>2020</b>	<b>RIA</b>
<b>NMBP-xx-2020: Ontologies and Information systems to support Industry Commons</b>	<b>2020</b>	<b>CSA</b>
<b>NMBP-xx-2020: Open Innovation Platform for Materials Modelling</b>	<b>2020</b>	<b>RIA</b>
<b>NMBP-xx-2020: Materials ERA-NET Co-fund</b>	<b>2020</b>	<b>CSA</b>

# DT-NMBP-08-2019 (RIA): Real-time nano-characterisation technologies

*From TRL  
4 to 6!*

## Specific Challenge:

Need real-time **nanoscale measurement** to meet increasing requirements of **fast processes, quality control, compliance and quicker time to market**. New instruments need **increased speed and reliability**, without sacrificing **measurement accuracy and precision**.

## Scope:

Address **1+ industrial applications**; real-time nano-scale characterization **during manufacturing**; measurable improvement, **adequate for industrial use**; exploited in close connection with manufacturing enterprises, **suitable for online/inline use** in the factory; ensure **transfer of knowledge/expertise** to industry/SMEs.

## Expected impact:

**Doubling (at least) speed of nanoscale characterization procedures**, leading to **significant increase in competitiveness**; **More efficient nanomaterial development and upscaling**, **nanomaterials-based product development**; **enhancement in controlling product quality and reliability**, **lifetime and environmental benefits**.

# DT-NMBP-10-2018 (RIA): Adopting materials modelling to challenges in manufacturing processes (Translator Tool)

*From TRL  
4 to 6!*

## Specific Challenge:

Improved decision making for materials producers and product manufacturers needs an environment that gives fast access to information and thereby allows reacting to changing feedstock, markets and regulatory demands.

This would need an **open translation environment** that **translates** a specific manufacturing **challenge** into a materials modelling **workflow** that provides knowledge to support optimal material and process design.

## Scope:

This environment should allow reuse of materials modelling software, **knowledge and expertise** in different industrial domains, by use of the models, protocols and systems in other relevant areas or sectors.

## Expected impact:

**Remove barriers** leading to an increased industrial user base of companies by a factor 2; Increased development speed by factor 5; Digital technologies leading to reduced development costs for industry by a factor 2; Cross-industry fertilisation;

# DT-NMBP-12-2019 (CSA): Sustainable Nano-Fabrication

*Integrating,  
Networking, Cooperation*

## Specific Challenge

Establish EU **synergy** in addressing **common challenges in industrial scale manufacturing** of functional systems based on manufactured nanoparticles with designed properties.

## Scope

- **A network managing information in technical domains**
- **Research and standards from nanoparticles to products**
- **Common nomenclature, metrology, measurements, characterisation**
- **Facilitate SMEs services and access to infrastructure**
- **Address sustainability and skills development**

## Expected impact

- **Strengthen nanoscale technology take-up and impact .**
- **Linking infrastructure and stakeholder community**
- **Develop EU wide research and innovation strategy**
- **Networking EU funded projects and initiatives and solving common issues**
- **Support international cooperation (e.g. US NSF and NNI)**

**EUR ~2 million**

Note: Synergy with EPPN, EMMC and EMCC may be helpful!



# FOUNDATIONS FOR TOMORROW'S INDUSTRY

## Governance, Science-Based Risk Assessment and Regulatory Aspects (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>NMBP-15-2019: Safe by design, from science to regulation: metrics and main sectors</b>	<b>2019</b>	<b>RIA</b>
<b>NMBP-34-2019: In support of documentary standards</b>	<b>2019</b>	<b>CSA</b>
<b>NMBP-16-2020: Safe by design, from science to regulation: behaviour of multi-component nanomaterials</b>	<b>2020</b>	<b>RIA</b>
<b>NMBP-17-2020: Global regulatory science consortium for medical technology based products</b>	<b>2020</b>	<b>RIA</b>



# NMBP-15-2019: Safe by design, from science to regulation: metrics and main sectors (RIA)

From TRL  
4 to 6!

## Specific Challenge:

**Reduce risk to acceptable levels**, ideally at an early stage of the nanomaterial development process (**Safe-by-Design**). The challenge now is to distil existing methods into **simple, robust, cost-effective methods for monitoring and modelling of physical-chemical properties and biological effect assessment** of nanomaterials in relevant use conditions including in product-relevant matrices.

## Scope:

**New Safe by Design methods; Degradation, ageing and mixture toxicity of nanomaterials; Implementation of control measures and mitigation strategies in various industrial sectors; International cooperation.**

## Expected impact:

Safe by design approaches and tools at an early stage of the development process; **Quality workplaces; Control and mitigate exposure to acceptable risk level; Low-cost techniques for delivering an integrated exposure driven risk assessment and the associated design of the required post-use monitoring.**

# NMBP-34-2019: In support of documentary standards (CSA)

## Specific Challenge:

**Adaptation of OECD guidelines for chemicals' notification and registration under REACH need adaptation for nanomaterials from characterisation of materials and exposure, to potential for persistence, bioaccumulation and toxicity.** Establishment of a set of scientifically reliable and regulatory relevant technical guidelines and good practices documents.

## Scope:

**Cover existing gaps in OECD test guidelines;** Establish integration of other public and private resources; Establish maximum **synergy** of actions **across industrial sectors and international cooperation;** Support the completion of the elaborated documents; Establish very **close cooperation** with Member States, OECD, BIAC, JRC, ECHA, EU and Member State agencies.

## Expected impact:

Assist the running OECD projects with the aim to **amend test guidelines and guidance documents;** Delivery of a consistent, complete and timely set of documents, to effectively **implement the existing chemicals' legal frameworks;** Establish seamless collaboration with the science layer of nanosafety.

# FOUNDATIONS FOR TOMORROW'S INDUSTRY MEDICAL TECHNOLOGY INNOVATIONS (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>DT-NMBP-21-2020: Custom-made biological scaffolds for specific tissue regeneration and repair</b>	<b>2020</b>	<b>RIA</b>
<b>DT-NMBP-23-2020: Next generation organ-on-chip</b>	<b>2020</b>	<b>RIA</b>



# TRANSFORMING EUROPEAN INDUSTRY FACTORIES OF THE FUTURE (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>DT-NMBP-18-2019: Materials, Manufacturing processes and devices for organic and large area electronics</b>	<b>2019</b>	<b>IA</b>
<b>DT-NMBP-19-2019: Advanced materials for additive manufacturing</b>	<b>2019</b>	<b>IA</b>

# DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics

From TRL  
3 to 5

## Specific Challenge:

Material development, improvement and prototyping of organic and large area electronics (OLAE), with seamless integration into traditional products at constant/lower production cost, and in a new generation of smart devices.

## Scope

- Combine materials with high uniformity and high mobility in industrial quantities with high reproducible quality;
- Improve environmental stability for operation in more robust environments and to reduce barrier requirements;
- Advance the TRL and manufacturability including high speed processes for the integration of flexible OLAE components onto flexible substrates;
- Prototyping and market trials, with market intro 2-4 years after project

## Expected impact:

- New products from the combination of printed & OLAE processed electronics in flexible and wearable electronics;
- Improvement in cost competitiveness, lifetime, processibility and manufacturability;
- Improved environmental stability (vapour and oxygen transmission rates) for products and printable commercial material charge carrier mobility.

# DT-NMBP-19-2019: Advanced materials for additive manufacturing (IA)

From TRL  
4 to 6

## Specific Challenge:

To use nanotechnologies to aggregate multiple materials within a single process, while improving or expanding their functionality, and enhancing their performance.

To develop equipment that allows the additive layer manufacturing of multi-materials items and multi-functional materials.

Scope: combining several materials for the development of ready assembled multifunctional devices:

Quantification of improved functionalities, properties; integration and validation at early stage (certification consideration); development with material's suppliers and end-users; standardization and regulatory aspects (safety and nanosafety)

## Expected impact:

Improved efficiency, quality and reliability of the product by at least 40%. Better use of raw materials and resources and 35% lower cost. New opportunities and business for SMEs across Europe (which are key players).

# TRANSFORMING EUROPEAN INDUSTRY MEDICAL TECHNOLOGY INNOVATIONS (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>DT-NMBP-21-2020: Custom-made biological scaffolds for specific tissue regeneration and repair</b>	<b>2020</b>	<b>RIA</b>
<b>DT-NMBP-23-2020: Next generation organ-on-chip</b>	<b>2020</b>	<b>RIA</b>





# INDUSTRIAL SUSTAINABILITY CATALYSING THE CIRCULAR ECONOMY (2018-2019)

Topic Title	Year	Type
<b>CE-NMBP-25-2019: Photocatalytic synthesis</b>	<b>2019</b>	<b>RIA</b>



# CE-NMBP-25-2019: Photocatalytic synthesis (RIA)

From TRL  
3 to 5!

## Specific Challenge:

The development of **integrated photocatalytic processes with a systems-catalysis approach** that includes engineering aspects as small-scale and intermittent operation.

## Scope:

Development of **cheap materials and integrated processes/devices for the direct photocatalytic conversion of CO<sub>2</sub>** (from anthropogenic CO<sub>2</sub> sources and/or from air) **and H<sub>2</sub>O to fuels and/or chemicals**, with an overall **solar-to-hydrogen efficiency of >20%**.

## Expected impact:

Development of cost-efficient systems based on multifunctional photocatalytic system which should enable upscaling and process intensification, with:

- **Increased efficiency** of the system with sunlight to chemical energy
- **Improved stability/robustness** of the system
- **Cost reduction/effectiveness** of the system (LCA)

# INDUSTRIAL SUSTAINABILITY

## CLEAN ENERGY THROUGH INNOVATIVE MATERIALS (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
LC-BAT-1-2019: Strongly improved, highly performant and safe all solid state batteries for electric vehicles (*)	2019	RIA
LC-BAT-2-2019: Strengthening EU materials technologies for non-automotive battery storage (*) (previously LC-NMBP-27-2019)	2019	RIA
<b>LC-NMBP-29-2019: Materials for non-battery based energy storage</b>	<b>2019</b>	<b>RIA</b>
<b>LC-NMBP-32-2019: Smart materials, systems and structures for energy harvesting</b>	<b>2019</b>	<b>RIA</b>
<b>LC-NMBP-28-2020: Advanced materials for innovative multilayers for durable photovoltaics</b>	<b>2020</b>	<b>IA</b>
<b>LC.NMBP-31-2020: Materials for off shore energy</b>	<b>2020</b>	<b>IA</b>

(\*) Call H2020-LC-BAT-2019-2020 Next Generation Batteries

# LC-NMBP-29-2019: Materials for non-battery based energy storage (RIA)

## Specific Challenge:

*From TRL  
3 to 5!*

**For sustainable energy production specific storage challenges have to be solved – but batteries may be not the best solution. So other technologies have to be developed, that can respond to these needs – and for those specific materials have to be developed that are price competitive, overall economically viable and environmental friendly.**

## Scope:

**Sustainable and recyclable materials for Power to Gas, Power to Chemicals and power to Liquids (based e.g. on ethanol, methanol or ammoniac), or compressed air storage**  
(Materials for thermal storage and for hydropower, as well as for fuel cells and supercapacitors are excluded from the call)

## Expected impact:

**Improving technical and economic competitiveness of EU stationary storage technology, and help to reach climate goals**  
**Significant improvements in the levelised cost for energy while maintaining or improving other properties of the storage solution**

# LC-NMBP-32-2019: Smart materials, systems and structures for energy harvesting (RIA)

## Specific Challenge:

Smart materials and material systems/structures for **harvesting, generating and storing energy**, hereby reducing energy consumption.

Challenges include the **materials' operational reliability, recyclability, dependence on rare elements, cost concerns, efficient manufacturing processes and implementation in a wide range of commercial applications.**

## Scope:

**New materials and material combinations with energy harvesting and storage capabilities** (e.g. lead-free piezoelectric based devices, automotive structural components or magnetic materials systems); **25% materials and processing costs reduction. Recyclability and reliability, reduced dependence on rare elements; Integrated sensor technologies** and potential linkage with the Internet of Things (IoT); **Assessed market perspectives.**

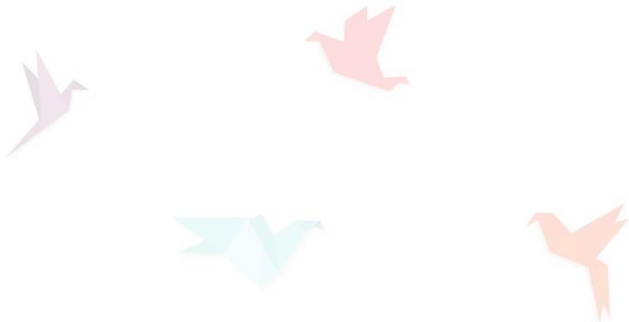
## Expected impact:

**Sustainable energy supply; >40% reduction of greenhouse gas emissions; 50% reduction of hazardous waste; Support implementation of DSM and IoT** (wireless sensor networks, or self-powered remote sensor nodes).

*From TRL  
3 to 5!*

# INDUSTRIAL SUSTAINABILITY CIRCULAR ECONOMY IN INDUSTRY (2019-2020)

Topic Title (TOPICS for 2020 are only tentative until now)	Year	Type
<b>Materials lifecycle analysis methodology for the circular industry</b>	<b>2020</b>	<b>RIA</b>





**Soren BOWADT**  
**Deputy Head of Unit**

**European Commission**  
**DG Research & Innovation**  
**Advanced Materials and**  
**Nanotechnology**

**COV2 05/105**  
**1049 Brussels/Belgium**  
**+32 229-94203**  
[\*\*soren.bowadt@ec.europa.eu\*\*](mailto:soren.bowadt@ec.europa.eu)

**About Horizon 2020**

<http://ec.europa.eu/research/horizon2020/>

