



SABYDOMA

Safety by Design Of nanoMaterials



SABYDOMA is the acronym for “Safety BY Design Of nanoMaterials - From Lab Manufacture to Governance and Communication: Progressing Up the TRL Ladder”, which is funded within the Horizon 2020 research and innovation programme. It is one of the four projects that have been funded under the NMBP-15 call (NMBP-15-2019 - Safe by design, from science to regulation: metrics and main sectors (RIA)).

All four projects (SABYDOMA, SbD4nano, SAbyNA, ASINA—see next pages) will work closely on their safe-by-design strategies and SABYDOMA’s coordinator, Andrew Nelson, as chair of the WG E – Innovation & Safer by Design, will represent all them at the EU - NanoSafety Cluster.

In April 2020 (29th and 30th) the partners of the SABYDOMA project met, virtually, to kick off this brand-new Safety-by-Design project.

The SABYDOMA project addresses developments in the safety by design (SbD) paradigm by examining four industrial case studies in detail where the TRLs will advance from 4 to 6. Each TRL activity will progress from being lab based at TRL4 to being industry based at TRL6. The TRL4 activity will involve only innovation with regular industrial communication whereas the TRL6 activity will involve industrially located activities with innovation communication. One of the novel themes of this study is to use system control and optimisation theory including the Model Predictive Control (MPC) philosophy to bind the whole subject of SbD from laboratory innovation to the industrial production line and from decision making page 24 of 69 NEWS 02/2020 processes to project governance. An equally important innovative step is the building of high throughput online platforms where nanomaterial (NM) is manufactured and screened at the point of production.

The screening signal controls the NM redesign and production in a feedback loop. Screens will involve (a) physiochemical sensing elements (b) in-vitro targets of increasing complexity from the 2D biomembrane to cell-line and more complex cell-line elements; and, (c) multiple in-vitro targets with multiple end-points; developed in current H2020 projects. Two of the industrial studies include composite coating manufacture where the coating’s stability and toxicity will be tested using a flow through microfluidic flow cell system coupled to online screens. This is part of the release and ageing investigations on the NM and NM coatings and the results of these will feed back to the production line design. At every step on the TRL ladder the in-silico modelling will be applied to optimise and redefine the relevant activities. By the same token regulatory and governance principles of SbD will be used to refine the technological development. The final deliverable will be four distinct technologies applying SbD to the four industrial processes respectively.

The partners of this project, which has a duration of 42 months (April 2020 – September 2023), come from academia, industries and research organisations from 15 European countries, Korea, Australia and Hong Kong and are experts in their fields, covering nanotechnology, nano engineering, nanosafety assessment, nanoregulation, nanoinformatics, nanomedicine, nanomaterials and emerging materials research. The project coordinator is Professor Laurence Andrew Nelson from the University of Leeds (United Kingdom).

Further information about the SABYDOMA project and updates on developments can be found on the project website www.sabydoma.eu

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A control system solution to Safety BY Design Of nanoMaterials.
From Lab Manufacture to Governance and Communication:
Progressing Up the TRL Ladder