Nanomaterials via Gas-Phase Synthesis: A Design-Oriented Modelling and Engineering Approach

Fact Sheet

Project Information

NanoDome
Grant agreement ID: 646121

Funded under
H2020-EU.2.1.3.1.

Project website

Overall budget
€ 3 999 110

EU contribution
€ 3 999 110

Start date
15 September 2015

End date
14 September 2018

Coordinated by
ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA

Italy

Objective

The main objective of the NanoDome project is to develop a robust model-based design and engineering toolkit for the detailed prediction of complex nanomaterial structures produced in a commercially-relevant generic bottom-up Gas-Phase (GP) synthesis process, to improve the control of the nanomaterial production and the industrially-scalable GP synthesis process for more accurate final product properties (e.g. particle size, surface area, structure, chemical composition, morphology and functionalization coatings) and provide potential end-users with a validated tool based on scientific principles that enables predictive design of novel nanomaterials and novel GP production routes thereby shortening their development process. This will be pursued by combining computational modelling, software development and
systematic validation activities at lab- and industrial-scale in a three-year project. Existing meso-scale nanomaterial GP synthesis modelling approaches (Lagrangian and stochastic) will be extended and integrated with continuum-scale reactor models to provide a fully functional single discrete mesoscopic model for the evolution of the nanoparticle population inside a control volume as a function of time, together with detailed description of nanoparticle composition and internal structure (e.g. core-shell, multi-layer, radially-dependent composition), particle interaction, coagulation and morphology. Industrial and lab-scale validation will focus on a set of target materials of great impact for the EU, using technologies currently at TRL4-6. The work proposed in the NanoDome project addresses the aforementioned challenges by delivering a modelling and analysis tool for the detailed prediction of complex nanomaterial structures formation in a single-step and industrially scalable GP synthesis process, in order to optimize existing processes, shorten the development of new processes and increase the production rates.

Field of science

/engineering and technology/materials engineering/coating and films
/engineering and technology/nanotechnology/nano-materials
/natural sciences/computer and information sciences/software/software development
/natural sciences/mathematics/applied mathematics/mathematical model

Programme(s)

Topic(s)

Call for proposal

H2020-NMP-2014-two-stage

Funding Scheme

RIA - Research and Innovation action

Coordinator

ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA

Address

Activity type

EU contribution

€ 821 295
Participants (5)

COMPUTATIONAL MODELLING CAMBRIDGE LIMITED

United Kingdom

EU contribution
€ 747 900,40

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Station Road Salisbury House
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Activity type
Private for-profit entities
(excluding Higher or Secondary Education Establishments)

Contact the organisation

CONSIGLIO NAZIONALE DELLE RICERCHE

Italy

EU contribution
€ 643 462,50

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Activity type
Research Organisations

Website
Contact the organisation

THE CHANCELLOR MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE

United Kingdom

EU contribution
€ 356 803,10

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Activity type
Higher or Secondary Education Establishments

Website
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UMICORE
Belgium
EU contribution
€ 737,149

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Activity type
Private for-profit entities
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Contact the organisation

UNIVERSITAET DUISBURG-ESSEN
Germany
EU contribution
€ 692,500

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Activity type
Higher or Secondary Education Establishments

Website
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Last update: 26 January 2017
Record number: 196842

Permalink: https://cordis.europa.eu/project/id/646121

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