

© 123RF

EUMINAFab: Integrating European Research Infrastructures for Micro-nano Fabrication of Functional Structures and Devices out of a Knowledge-based Multimaterials Repertoire

Micro- and nanotechnologies have the potential to create economic growth in every geographical area of Europe and among almost every industry leading to new product innovations, new companies and new jobs. Yet research at the forefront of nano- and microfabrication technologies often demands the use of expensive and highly specialised techniques and trained technical personnel. EUMINAFab aims to overcome the economic barriers and lack of skills by giving researchers access to 36 installations. It brings together the scientific and technological skills of 10 partners from eight countries to create a pan-European toolbox for micro- and nanotechnologies for structuring and characterising a multitude of functional materials.

● GOOD THINGS COME IN SMALL PACKAGES

Nanotechnology is the study of phenomena and fine-tuning of materials at atomic, molecular and macromolecular scales – usually between 1 and 100 nanometres (nm) – where properties differ significantly from those at a larger scale. To give an idea of the scale in question, 1 nm is one billionth of a metre – tens of thousands of times smaller than the width of a human hair.

Yet, despite the small size of the phenomena under investigation, the field of nanotechnologies could have a major impact. Indeed, products based on nanotechnology are already in use and market analysts predict that the world market for nanotechnologies will be worth €750–2 000 billion by 2015, and estimate that 10 million nano-related jobs will be created by 2014 – i.e. 10% of all manufacturing jobs worldwide.

The applications of nanotechnologies are expected to bring everyday benefits for consumers through new products, novel health applications and reduced environmental demands. Applications already appearing include improved materials and surfaces, information and communication technologies, medical diagnostics, therapeutic tools, textiles, household products and so forth.

EUMINAFab is working to solve major challenges in the field of micro- and nanomanufacturing on a pan-European level by joining forces of partners from industry and academia.



In particular the understanding and use of new functional materials in miniaturised arrangements is inhibited by the lack of reliable, interoperable and validated processes for structuring and characterising these materials at the micro- and nano-scale.

In addition, the fragmentation in the area of multimaterial micro- and nanomanufacturing in Europe has led to successful but rather isolated technical solutions. Even if the specific technical performance allows for world-leading developments, these isolated technologies tend to be difficult to transfer to further application fields and prevent them from being as influential as they might be for future products.

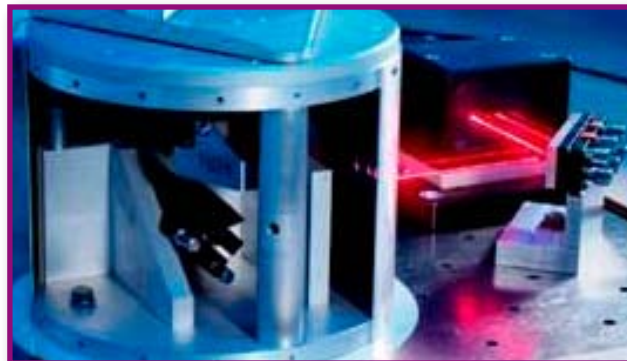
● A MICRO-/NANOTECHNOLOGICAL TOOLBOX

Focusing on emerging multimaterial micro and nano technologies, EUMINAFab aims to ensure that European researchers have access to high-end instruments, so they can process and characterise a multitude of functional materials as well as being able to structure and integrate different materials into complex functional devices.

This is achieved by bringing together the facilities and expertise of 10 partners who between them will make freely available in excess of 30 pieces of high-end equipment, creating a unique micro- and nanotechnological 'toolbox' for structuring and characterising a multitude of functional materials.

Research and development groups from both industry and academia may apply to use the facilities through an Internet-based 'entry point'. In addition, EUMINAFab has 40 technical experts available to discuss the specifics of experimental design and the most appropriate technologies available for every project idea.

This is a unique concept to the European Research Area, as until today no such pan-European infrastructure has been established and made available to the European micro- and nano-research community.



The project will also incorporate joint research activities designed, for example, to define 'technology-readiness levels' which assess the technical maturity of a new material or device, for example, and in selected cases lead to the integration of currently isolated processes. An exchange programme will provide training and experience for in-house researchers to visit other partner sites. Outreach activities aim to inform potential users, especially those in countries where access to the technologies is less openly available.

Integrating European Research Infrastructures for Micro-nano Fabrication of Functional Structures and Devices out of a Knowledge-Based Multimaterials Repertoire



Project acronym: EUMINAFab

Funding scheme (FP7): Integrating Activities (IA)

EU financial contribution: €6 million

EU project officer: Hugues Crutzen

Duration: 48 months

Start date: 1 March 2009

Completion date: 28 February 2013

Partners:

Karlsruhe Institute of Technology (DE)

Cardiff University (UK)

Commissariat à l'Energie Atomique (FR)

Centro Ricerche FIAT S.C.p.A. (IT)

Kungliga Tekniska Högskolan (SE)

Fundación TEKNIKER (ES)

Philips Research Europe (NL)

Fraunhofer Gesellschaft (DE)

IMS Nanofabrication AG (AT)

NPL Management Limited (UK)

Coordinator: Matthias Kautt, Karlsruhe Institute of Technology (KIT),
mattias.kautt@kit.edu

Project webpage: www.euminafab.eu