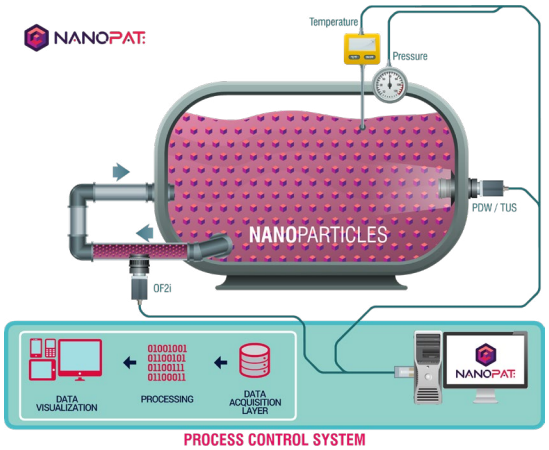
What is NanoPAT about?

Nano-scaled materials are abundant in different stages of industrial manufacturing. Physical and chemical properties of these materials are strongly dependent on their size. Characterisation of mean size, size distribution, and shape of nano-scaled particles is very critical for the quality and efficiency of manufacturing processes.

The NanoPAT consortium aims at closing this gap by the demonstration of 3 novel, real-time nano-characterisation Process Analytical Technologies (PAT), namely Photon Density Wave spectroscopy (PDW), OptoFluidic force induction (OF2i) and Turbidity Spectrometry (TUS) including real-time data handling for digital process monitoring and product quality control. Those will be validated in 5 different industrial ceramic, polymer and mineral nanoparticles manufacturing and converting environments.



Our Team

Our partners are from the following countries: Austria, France, Germany, Greece, Netherlands, Portugal, Spain, Switzerland. They bring together solid scientific knowhow in the relevant fields and strong industrial and commercial involvement to ensure that the value chain of commercial actions can progress swiftly towards the introduction of new real-time solutions for the monitoring of nanoparticle production processes. All partners contribute actively to the project, ensuring the flow of ideas and projects results to the wider community.

IRIS · Universität Potsdam · Med Uni Graz · UPV EHU POLYMAT · zhaw · PDW ANALYTICS · ANALISIS-DSC · DSM · EVONIK · FLUIDINOVA · ARKEMA · creative nano · TEMAS Solutions · BNN · exelisis · BRAVE ANALYTICS

Get in touch with us!

nanopat_coordination@iris-eng.com

NANOPAT:

Process Analytical Technologies for Industrial Nanoparticle Production

Online real-time characterisation solutions for nanoparticle production processes

To learn more visit:

www.nanopat.eu

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Process Analytical Technologies

These are the three novel complementary real-time in situ particle size characterisation technologies (Process Analytical Technologies (PAT)) that are being further developed in NanoPAT:

Photon Density Wave Spectroscopy

An inline process analytical technology capable of calibration-free quantification of light absorption and light scattering in highly turbid, highly concentrated liquid dispersions.

OptoFluidic Force Induction

An active, single particle based high throughput PAT based on induced photonic & microfluidic forces. It provides statistically relevant data streams for particles from 20 nm up to several microns.

TUrbidity Spectrometry

A flexible optical technique for monitoring the evolution of suspending particles which size ranges from approx. 100 nm up to few microns.

Case Studies

NanoPAT will validate the combination of different nano-characterization technologies in 5 industrial case-studies, demonstrating the viability of the proposed PAT solutions for the industrial NPs production of polymers, silica, hydroxyapatite, zeolites and for the dispersion of ceramic NPs into coatings via electrodeposition method.

Case Study 1 – Polymers

Monitoring Particle Formation of Polyurethane dispersions and Polyacrylate emulsions.

Case Study 2 – Silica

Real-time in-situ monitoring of the genesis of nanostructured silica under different precipitation conditions.

Case Study 3 – Hydroxyapatite

Nanohydroxyapatite particle size characterization using online OptoFluidic force induction (OF2i) technology.

Case Study 4 – Zeolite

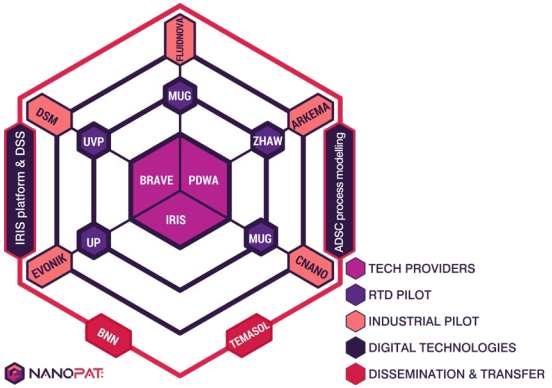
Continuous inline characterization for the manufacturing of zeolites in batch and continuous systems.

Case Study 5 – Ceramic

Monitoring of ceramic nanoparticle suspensions in pilot scale production of nanocomposite coatings.

Work plan

The project is divided into 9 work packages covering the scientific and technical aspects of the project, exploitation and dissemination of results, knowledge transfer, market strategy and project management.



WP1 – Definition of the nano-monitoring technologies requirements

WP2 – Photon Wave Density Spectroscopy (PDW) Development

WP3 – OptoFluidic Force Induction (OF2i) Development

WP4 – Turbidity Spectrometry (TUS) Development

WP5 – Monitoring Technologies integration, Data Analysis and Simulation software

WP6 – NanoPAT Industrial Pilot Plant Demonstration

WP7 – Knowledge Transfer & Dissemination

WP8 – Market Strategy & Innovation Impacts

WP9 – Project Management