

Nanotech for water purification

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The adaptation of highly advanced nanotechnology to traditional process engineering offers new opportunities for innovative technological developments in the water sector¹. There are various existing and emerging processes and products with respect to water and wastewater treatment such as (a) nanomembranes and nanoporous polymers for water purification, desalination, and detoxification, (b) nanosensors for the detection of contaminants and pathogens, (c) nanoporous zeolites for water purification, (d) nanocatalysts and magnetic nanoparticles for water treatment and remediation, (e) TiO₂ nanoparticles for the catalytic degradation of water pollutants.

In our approach we are focused on the development of new functionalized filtration modules through smart nanoengineered filters (NEWs) for a more efficient and reliable treatment of different water sources. The basic filtration material should compose of metallic microsieves which in general feature a homogeneous pore size distribution, higher robustness and an enormous filtration capacity².

We are looking for projects and/or partners from following fields of interest:

- material science
- water and wastewater technology
- nanotechnology
- instrumental analysis
- coating technology
- microtechnology

Summary of Fraunhofer UMSICHT's present R&D projects on EU level:

- Strengthening the energetic use of biomass in Central and Eastern Europe by establishing a standardised transnational consulting net for regions
- Coal mine methane – new solutions for use of CMM - reduction of GHG emissions
- Bioenergy register for sustainable site development in European regions
- Investigation of adsorption and swelling behaviour of coal to determine the feasibility of CO₂ sequestration and CH₄ production enhancement
- BLES - Blended Learning Environmental Science in the field of biodegradable waste
- Tri-generation, CHP and cooling, with integrated flue gas-condensation based on solid biomass fuels

¹ N. Savage, M. S. Diallo, J. of Nanoparticle Research, 7, 331-342 (2005)

² I. Gehrke, J. Robert, G. Deerberg, 9th International Conference on Inorganic Membranes (Lillehammer 2006)

- "Biogas Integrated Concept - A European Program for Sustainability"
- CO₂ Capture with Hydrogen Production
- Leading European RTD Sustained High Value Innovative Production for Manufuture
- Guideline for Safe and Eco-friendly Biomass Gasification
- European Center for Elastomeric Powders
- A New Technology for Conversion of Waste Fats to High-Qualitative Fuels
- Reuse of Used Frying Oils to Produce Biodiesel (Municipality of Oeiras, Portugal)
- A Project to Extend the Life of Energy Transmission and Distribution Tranformers by Total Management of Insulation Systems
- European Waste Sector Assistant
- Initiative 4 Faciliating Integration of Research Potential from the Accession Candidate Countries with the Potential of Member States in the area of Water Cycle and Soil Related Issues
- Set-up of a Market-Oriented Methodology for joining SMEs within Integrated EU research projects on Innovative Clean and Environmental Technologies
- Integrated researchers on materials, technologies and processes to enhance MCFC in a sustainable development
- Organisations involved in the prediction and analysis of fluid transient in pipe systems
- Development of an improved energy recovery of biogas by cooling and removal of harmful substances
- Water Hammer Induced Loads on Materials and Structures of Nuclear Power Plants