SHARED INNOVATION

OUR APPLICATION DRIVEN OPEN INNOVATION PROGRAMS

TNO innovation for life

The European chemical industry has to become less dependent on a single group of fossil raw materials and less energy intensive. This transition from fossil to renewable offers new business opportunities for the chemical industry and can increase its sustainability.
In addition it offers opportunities to locally produce specialized products near the sources of the raw materials and energy, such as biomass, CO_2 and other sustainable energy resources.

At TNO we support this transition by reducing costs, getting new products into the market faster via bilateral contract research and open innovation activities in the field of feedstock flexibility, efficient processing and improved product functionality. Next to our bilateral contract research, we actively work together with public and private partners in application driven long-term innovation programs. TNO, together with knowledge institutes and industrial partners, has committed to three long-term open innovation programs to further support the transition in chemicals: Brightlands Materials Center (Polymer materials), VoltaChem (Industrial electrification) and Biorizon (Biobased aromatics).
Additionally, we work actively together with the Topsector Chemicals on enabling tools and technologies that further enhance the effectiveness of these programs.

BRIGHTLANDS MATERIALS CENTER

The world population will continue to grow in the 21st century to become nine billion by 2050. The need for new sustainable products and materials will grow with population growth. This asks for an efficient way of using and re-using materials. The Brightlands Materials Center will take up this responsibility and dedicate its research and development programs and other activities to a sustainable society. The heart of the Brightlands Materials Center is an evolving ecosystem where scientific excellence, innovative applications and societal challenges come together.
The Brightlands Materials Center offers a meeting place at Brightlands Chemelot Campus and close collaboration with a global network of leading companies along the value chain and renowned universities and institutes. The themes of our research address major societal challenges such as sustainable energy, mobility, and health & well-being.

TNO is actively participating in the following three R&D programs:
- **Lightweight Automotive:** Critical material aspects of thermoplastic composites.
- **Opto-Electronics:** Nano-structured polymeric coatings controlling light behavior.
- **Additive Manufacturing:** Material development for 3D printing.

www.brightlandsmaterialscenter.com

VOLTACHEM – ELECTRICATION OF THE CHEMICAL INDUSTRY

With more solar and wind energy being produced, sustainable electricity supply in North West Europe is constantly increasing. This source of energy might be exactly what the chemical industry needs to enhance its competitive position.

Applied knowledge institutes TNO and ECN, together with industrial and academic partners, founded VoltaChem to initiate and facilitate collaborative development of technology and business models with the aim of moving innovation faster towards commercial implementation. VoltaChem is a business-driven Shared Innovation Program that connects the electricity sector to the chemical industry.
New technologies are developed and implemented that focus on the conversion of renewable energy to heat, hydrogen and chemicals. VoltaChem serves and works with the industry to strengthen its competitive position and that of suppliers.

TNO is actively participating in the following three R&D lines:
- **Power-2-Integrate:** System integration aspects and technology scouting.
- **Power-2-Specialties:** Electrochemical synthesis of high-value specialty chemicals.
- **Power-2-Commodities:** Electrochemical conversion of CO_2 to commodity chemicals.

www.voltachem.com

BIORIZON – THE WAY TO AROMATICS

Aromatics are one of the main feedstocks of the chemical industry, constituting 40% of the total market. Currently, these are exclusively produced from fossil sources, generating considerable CO_2 emissions. Developing biobased aromatics will reduce dependence on petroleum and lead to lower CO_2 emissions. By using waste streams as a raw material, Biorizon is helping to enable the transition to a circular economy and offering profitable and sustainable prospects for the chemical industry and its supply chain.

Biorizon is a Shared Research Center with a focus on technology development for the production of functionalized biobased aromatics for performance materials, chemicals and coatings. TNO, VITO and the Green Chemistry Campus launched Biorizon together with regional partners and industry. We work with partners to develop technologies to produce functionalized aromatics from organic waste. We anticipate the expected growing shortage of aromatics from the petrochemical industry and the widely shared ambition to green the chemical industry. Our focus is on the technology development for the production of biobased aromatics for performance materials, chemicals and coatings.

TNO is actively participating in the following R&D lines:
- **Sugars-to-Aromatics:** Production of functionalized aromatics from sugars.
- **Waste-to-Aromatics:** Production of functionalized aromatics from waste.

www.biorizon.eu

TNO.NL

TNO
Innovation with purpose is what TNO stands for. We develop knowledge not for its own sake, but for practical application. All of these application driven Shared Research Centers are based on the open innovation methodology. Interested in joining us? Please contact us!

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