



TECHNOLOGY CENTER

UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

[CIRCULAR ECONOMY]

RESEARCH, DEVELOPMENT & INNOVATION AT THE UNIVERSITAT POLITÀCNICA DE CATALUNYA (UPC)

The Universitat Politècnica de Catalunya (UPC) specializes in the areas of architecture, science and engineering, including Circular Economy technologies. In this field, the main focus areas are:

- Reduction in the use of resources and environmental protection
- Recycling and waste valorisation
- Ecodesign

As a result of the UPC's recognized research track record in its areas of specialization, we can offer a wide range of services:

- R&D technology transfer projects
- Consortium for national and Horizon Europe projects
- Patents
- Technology assessment
- Specialized facilities

The UPC is the leading university in Spain in volume of research and technology transfer to companies, and has become one of the major hubs of knowledge in Southern Europe.

WATER TREATMENT: PURIFICATION AND REUSE

- Biotechnologies for the recovery of water and other resources.
- Development of tools for support in the implementation and management of wastewater reuse.
- Recovery of ammonium from wastewater and valorisation for agricultural use.
- Restoration of water resources with purified water (artificial aquifer recharge).
- Green synthesis of metal nanoparticles based on acid mine water and extracts from agri-food waste.
- Production of biostimulants from cyanobacteria and wastewater.

EMISSIONS AND POLLUTANTS

- Zero ship emissions.
- Selective absorption of SO_x and NO_x from combustion gases.
- Advanced biological technologies to eliminate gaseous pollutants.
- Biovalorisation of CO₂ for sustainable production of biomethane.
- Pollutant detection systems through image processing and sensors.
- Catalysts to eliminate and transform CO₂ into ethanol.
- Elimination and mitigation of pollution caused by the use of pesticides.



RECYCLING AND WASTE VALORISATION

TEXTILE

- Treatment and reuse of dye wastewater.
- New spun fabrics from clothes waste and textile scraps.
- Automatic system for classifying textile fibre for recycling.

CONSTRUCTION

- Development of sustainable concrete from incineration waste.
- Valorisation of paper industry waste for the manufacture of asphalts and concretes.
- New materials for infrastructure from MARPOL waste.

FOOD

- Solutions to improve the carbon, nitrogen and phosphorus cycle in the agri-food industry and cut emissions.
- Sustainable treatment of wastewater and food waste.
- Design of sustainable compounds manufactured from the valorisation of agri-food waste.
- Integrated, sustainable management of industrial waste from cork.

PLASTICS AND POLYMERS

- Recycling and revalorisation of opaque PET into high added-value materials.
- Transformation of cellulose materials into advanced, environmentally friendly bioproducts.
- Obtention of biofilms with barrier properties from renewable resources.

METALS

- Smart bioprocesses to recover metals at the end of the life cycle of mobile and electronic equipment.
- Valorisation of titanium sheet waste for the production of metal powder.
- Circular processing of salt mine water to recover minerals and metals.
- Study of processes of attenuation of metal and inorganic compounds through mineral nanoparticles.

BATTERIES AND VEHICLES

- Models of use and management of second-life batteries.
- Hybrid energy storage systems for renewable energy production plants.
- Improvement in the efficiency and useful life of PEM fuel cells.
- High-performance modular batteries for urban sustainable electric mobility services.

PRODUCT

- Ecodesign of products on a large scale and internal parts for vehicles.
- Biodegradable microencapsulation techniques for fragrances.
- Development of cellulose microdevices of low environmental impact for immediate biodiagnosis.
- New products for the construction and automotive industries based on biomaterials.

INDUSTRIAL PROCESSES

- Advanced, reconfigurable manufacturing processes that can be adapted to consumer preferences.
- Methods and tools for the implementation of circular economy models in the manufacturing processes.
- Recovery and valorisation of byproducts of industrial processes.

URBANISM (TERRITORY AND INFRASTRUCTURE)

- Greenhouses integrated into rooftop terraces: symbiosis of energy, water and CO₂ emissions with the building.
- Biosustainable solutions to improve the acoustic properties and fire-resistance of building cladding.
- Recovery and valorisation of urban digestates.





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