

TECHNOLOGICAL CENTRE LUREDERRA



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31210 - Los Arcos (Navarra-España)



Lurederra in brief

L'Urederra Foundation, **non-profit private entity created in June 1999**, conducts and promotes research and technological development activities in the service of companies and economic operators, including the subsequent implementation of innovations developed in their own production facilities not only nationally but also internationally.

EVOLUTION

INSTALLATIONS:

- Year 2011: Own headquarters of 5.500 m² (2.500 m² built)
- Year 2013: Expansion of Industrial Unit rented in Los Arcos (+900 m²)
- Year 2016: Expansion of Industrial Unit, own acquisition, in Los Arcos 2.230 m²

CURRENTLY IN TOTAL: **8.630 m² (4.530 m² built)**

PERSONNEL:

- October 2000: 4 people
- 2025: 35 people

Industrial vision:

Continuous development of marketable products and technologies quickly transferable and exploitable.



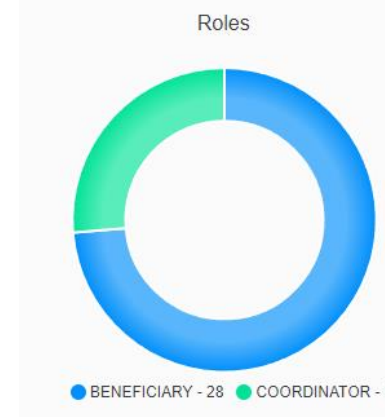
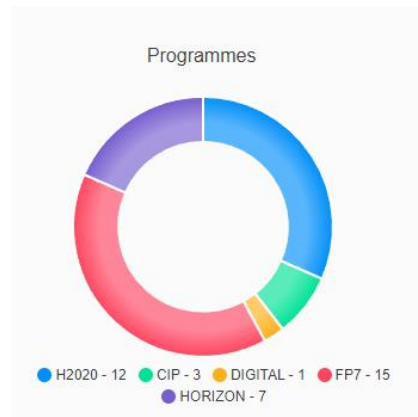
Main activities and strategy

- **Internal research activities for the development of technologies and products:** RESEARCH FOR EXPLOITATION, diverse active formulations are becoming market products by the sale or transference of technology: AQUASHIELD, TECNADIS PRS PERFORMANCE, TECNADIS GWR, TECNADIS METALCOAT, TECNADIS SELFCLEAN PV, TECNADIS MULTICOAT, TECNADIS COATEX, recycled PVB, special nanocoatings, new products based on sophisticated nanoparticles, etc.
- **Participation and coordination in collaborative projects at national and international level:** implying cutting-edge technologies to be rentabilised in the near future.
 - RTD Projects of large scope: 400 (Under contract/technology acquisition)
 - International Projects, EU Framework Programme: 34 (Coordinator of 10) – one of the most active agents in Navarre.
 - LIFE/ CIP International Projects: 12 (Coordinator of 12)
 - International Patents published: 3 completed
 - National and International recognition as a Technological Centre with high experience in Nanotechnology
- **RTD developments with private companies**
- **Investment in new commercialisation routes, creation of Spin-off companies:** The concept of technological centre transformed into “production entity”. First case in 2007, Tecnología Navarra de Nanoproductos S.L. (*TECNAN*) *production and commercialisation of nanoproducts at industrial scale*



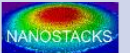
"Think Big, Act Nano"

<https://tecnan-nanomat.es/>



H2020 Projects (on-going)

NANOSTACKS: “Nanostack printing for materials research” H2020-EIC-FETPROACT-2019-951949



WASTE2FRESH: “Smart innovative system for recycling wastewater and creating closed loops in textile manufacturing industrial processes” H2020-SPIRE-2020-958491



MAREWIND: Materials solutions for cost Reduction and Extended service life on WIND off-shore facilities. H2020-NMBP-2020-952960. **COORDINATOR**



SUNRISE: MultiSensor sorting tools in a circular economy approach for the efficient recycling of PVB interlayer material in high-quality products from laminated glass construction and demolition wastes. H2020-LCCI-2020-958243. **COORDINATOR**



Horizon Europe

SUSAAN “SUStainable Antimicrobial and Antiviral Nanocoating” HORIZON-CL4-2021-101057988 **COORDINATOR**



FREE4LIB “Feasible recovery of critical raw materials through a new circular ecosystem for a Li-ion battery cross-value chain in Europe” HORIZON-CL5-2021-101069890



Platform-ZERO “Customizable AI-based in-line process monitoring platform for achieving zero-defect manufacturing in the PV industry” HORIZON-CL4-2021-101058459



SUNRISE “Safe and sUSTainable by design: integRATED approaches for Impact aSsessment of advanced matERials” HORIZON-CL4-2023-RESILIENCE-101137324



SOLINDARITY “SOLar-driven INDustrial power And heat upgRaded with high-temperature heaT pumps for enhanced integrated process efficienCY” HORIZON-CL5-2023-D3-101136148

BEETHOVEN “SUBSTITUTION OF RARE-EARTHS FOR ADVANCED NOVEL MAGNETS IN ENERGY AND TRANSPORT APPLICATIONS” HORIZON-CL4-2023-RESILIENCE-101129912

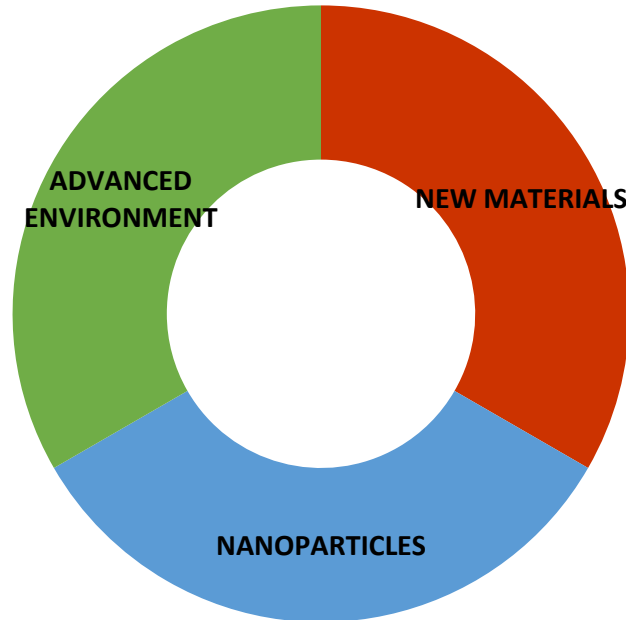


NEOCYCLE “UPCYCLING OF NdFeB MAGNETS IN THE EU FOR GREEN APPLICATIONS (NEO-CYCLE)” HORIZON-CL4-2023-TWIN-TRANSITION-01-101138058



LUREDERRA RTD AREAS

- Wastewater Treatment
- Revalorisation of organic wastes
- Metal decontamination and metal recycling from wastes
- Nanoparticles applied to environment
- Absorbents for removal and recovery pollutants



- Advanced materials development (functionalised)
- Plastic processing technologies.
- Plastics recycling
- Materials for construction with special properties

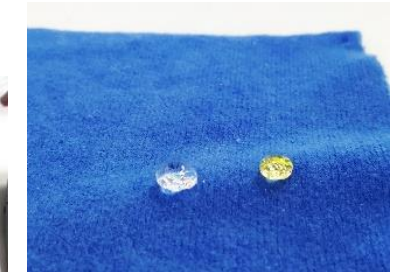
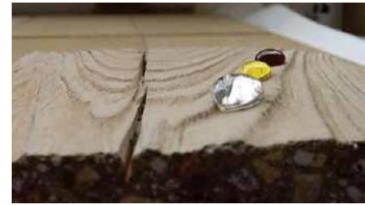
- Advanced nanoparticle production: simple and complex (mixed, doped, core-shell) nanooxides, phosphates and carbonates.
- Production of customised nanoparticle dispersions in different concentrations with high stability.
- Ready-to-use nanoproducts.
- Specific surface treatments
- Synthesis of specific functional compounds.
- Synthesis and modification of nanoclays.

NANOPARTICLES AND NANOTECHNOLOGY

NANOSURFACE TREATMENT / NANOENABLE MATERIALS / COATINGS:

Different properties on different substrates (*stone, gypsum, wood, mortar, glass, metal, epoxy, textile, plastics*):

- Hydrophobicity/Oleophobicity
- Anti-stick/Easy-to-clean/Antifouling
- Anticorrosion
- Anti-bacterial/virucide
- Hardness
- Photocatalysis
- Infrared radiation barrier
- Aesthetic effects



PILOT APPLICATIONS ON SITE AND FINISHED REAL PRODUCTS

Manual on-site applications



Automated coating line for pipelines



Motoman MH6 Robot



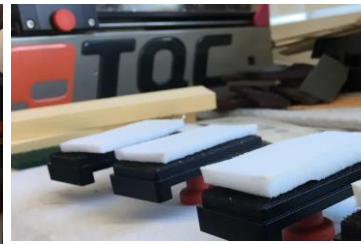
Spray booth and curing oven



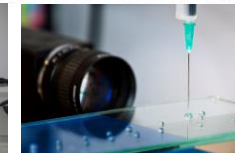
NANOPARTICLES AND NANOTECHNOLOGY

COATINGS CHARACTERISATION

- Contact angle – goniometry ISO 15989:2004
- Cross cut – adherence ISO 2409:2007
- Roughness
- Thickness
- Hardness: Shore C and Pencil test ISO 15184:2012.
- Glossmeter (triple angle 20°, 60° and 85°)
- Transmittance
- Exposure to specific raditation: IR light and solar spectrum.
- Abrasimeter (dry/wet scrub) – durability ISO 11998
- Saline mist chamber
- UV ageing
- Antimicrobial activity (ISO 22196)
- Anticorrosion by LSV and EIS



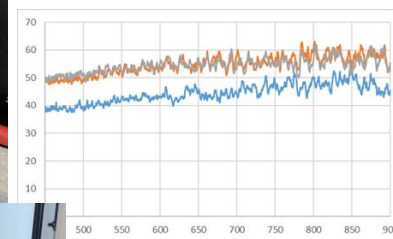
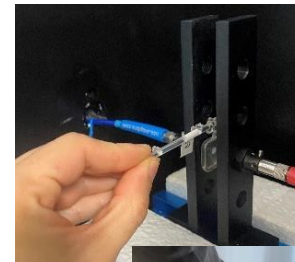
Abrasimeter



Contact angle



Glossmeter



Transmittance



Potenciostat



Saline mist chamber



UV ageing



Microbiology



ADVANCED ENVIRONMENT

WASTE WATER TREATMENT

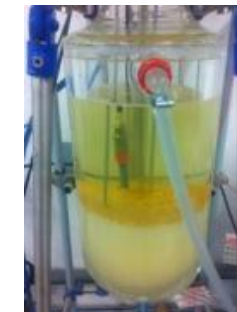
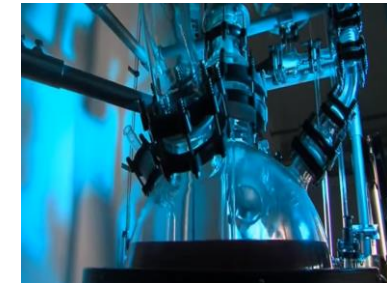
- Innovative materials for pollutants removal (hydrocarbons, FOGs, heavy metals, PPCPs) and waste water treatment:
 - Elastomeric material for removal of fats, oils, grease and hydrocarbons in contaminated waters.
 - Novel absorbents and nanoresins for metals removal and organic pollutants.
 - Functionalised clays.
 - Nanoparticles: simple or mixed oxides (FeO, MnO₂, doped TiO₂...) for adsorption or photocatalytic effect.
- Facilities for testing: Modular Waste Water Treatment Plant for physical-chemical treatment of variable polluted waters: coagulation-flocculation module, advanced oxidation process, filtration module and decanter (0,5-2 m³/h capacity).



ADVANCED ENVIRONMENT

RECYCLING AND WASTES VALORIZATION:

- Materials and metal recycling from WEEEs: Leaching, solvent extraction and precipitation technologies for recovery of precious metals, rare earths and Critical Raw Materials.
- Extraction of added value chemicals from agro industrial-wastes: mild processing techniques of milling, extraction, concentration and purification of bioactive compounds.



NEW MATERIALS

PLASTICS PROCESSING AND FUNCTIONALISATION:

- Additivation of plastics and paints, functionalisation and modification of nanocharges (nanoclays and nanoparticles)
- Plastics processing capabilities
 - Rollers, hot and cold plates press
 - Single and double screw extrusion (20 kg/h)
 - Injection and moulding (60 Tn)
 - Blown extrusion



PLASTICS RECYCLING:

- Recycling solutions for end-of life plastic (single and mixed plastics)
 - Chemical recycling
 - Pilot line for PVB recycling from laminated glass
 - Pilot line for polyolefins separation
 - Pyrolysis equipment and distillation reactor for plastic pyrolysis and fraction separation





**6. BIOECONOMY NATURAL
RESOURCES AND
ENVIRONMENT**

- Plastic recycling
- Synthetic textile chemical recycling for monomer recovery
- WEEE fractionation and selective metal recovery
- Bioactive compounds extraction from biomass
- Different ecosystem remediation materials development

CIRCBIO-01: Improving circularity of multilayer flexible plastic food contact packaging (17/09/2026)

PLASTICS RECYCLING

- **Chemical reactors** for bioplastics recycling and monomer recovery via **hydrolysis** or **alcoholysis**: laboratory scale, pilot scale (50-1000 L)
- Mechanical treatment capabilities for crushing and sieving plastic residues as a pretreatment to improve the performance of the chemical recycling.



FOOD PACKAGING COATING DEVELOPMENT

- Development of safe formulations for food applications.
- Use of biobased materials in the formulation.
- Improvement of vital properties such as antimicrobial and barrier properties to slow food spoilage down.



ANTIMICROBIAL

Non-stick and antibacterial coating show antimicrobial activity against Escherichia coli (99,94%) and Staphylococcus aureus (99,37%).

All the experiments were conducted according to the standard operating procedure (SOP) based on ISO 22196.

CE-SC5-07-2020: H2020 [SUNRISE](#) project
Coordinator PVB recycling treatment and postprocessing

 SUNRISE



CIRCBIO-02: Advancing recycling technologies for mixed post-consumer textiles waste from blended products (17/09/2026)

Lurederra can contribute to the testing of different protocols for the textile recycling and the separation of natural and synthetic textile blends with the selective dissolution of the synthetic fraction.

- Facilities for End-of-Life textile materials recycling:

- Mechanical treatment (crushing and sieve) for the mechanical disassembly of the non reusable textile parts.
- Chemical reactors for monomer recovery in synthetic textiles by using non hazardous hydrolysis agents of the and additionally hydromechanical treatment.



CIRC BIO-03: Advanced recovery of critical raw materials from Waste from Electrical and Electronic Equipment (WEEE) (17/09/2026)

Lurederra works on the recycling and recovery of precious metals from **Batteries, Printed Circuit Boards, PVs, Wind Turbines, Automobile Residues**, among other scrap and WEEEs.

Different elements such as **Rare Earths** and **Critical Raw Materials**, even other **precious metals** can be recovered from these wastes and other end of life products.

Lurederra has developed a pilot plant for the **WEEE** metallic fraction recovery including **crushing, sieve conveyor belt** and **magnetic separation** for further leaching and selective recovery.

Lurederra has developed **pilot equipment** for selective recovery of targeted elements. The **pilot plant** is composed of **three reactors of 1.000 litres capacity** including the steps of **leaching-precipitation and solvent extraction**, with different recuperation rates depending on the composition of the wastes and the targeted element to be recovered.



Mixtures of DES for different targeted elements:
 Ag, Au, Co, Cu Fe, Pb, Zn
 Choline Chloride/Lactic Acid (1:2) *OR*
 Choline Chloride/Ethylene glycol (1:2)

Waste treated	CRM recovered	PROCESSES
Catalysts	Pd, Pt, Rh	Acid leaching/Selective Extraction
Printed Circuit Boards (PCBs)	Cu, Sn	Acid leaching
WEEEs connectors	Au	Acid leaching
FPDs (Flat Pannel Display)	Indium, Yttrium	Acid leaching/Selective Extraction/Precipitation
PVs (photovoltaics)	Ag	DES
PCBs	Ag	DES
Capacitors	Nb	Acid leaching

CIRCBIO-11: Harnessing the unique properties of marine organisms to deliver sustainable blue bio-based products (17/09/2026)

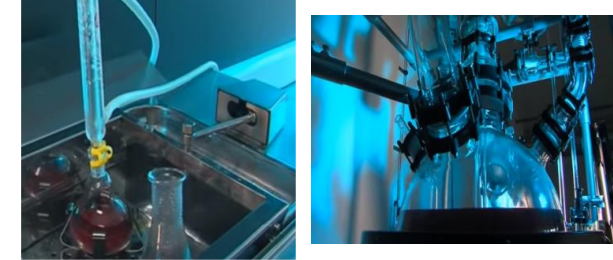
Mild extraction techniques for the bioactives extraction

Extraction of active compounds from biomass wastes.

- ❑ **Different extraction technologies:** ultrasound, wet milling, hydrodistillation, maceration, disperser...
- ❑ **Analysis and characterisation:** HPLC, IR, UV-Vis...
- ❑ **Industrial up-scaling of processes and products:** from mL to > 100 L reactors. Industrial ultrasonic processors and disperser's... Room enabled for the production of cosmetic products.
- ❑ **Knowledge on encapsulation techniques:** Preservation or avoiding bad flavours of certain interesting bioactive.
- ❑ **Previous expertise in marine biomass:** The centre has developed previous extraction tests with marine biomass such as Spiruline micro algae and Shrimps residues.

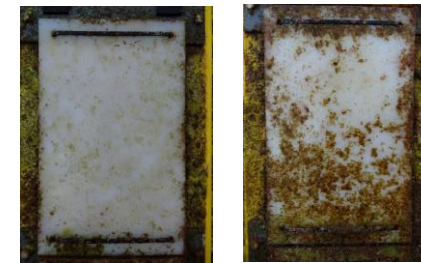


Pilot scale testing setup used to work at 200 L batches. ([A] 1000 L reactor, [B] homogeniser and [C] decanter setup)



Possibilities of validation of extracted chemical as coating additives

- ❑ **Possibility to act as a validator:** Lurederra can offer its expertise in the development of coatings for the validation of the extracted materials as additives.
- ❑ **Antifouling coatings expertise:** Lurederra has previously developed antifouling coatings with promising results.
- ❑ **Possibilities for SSbD formulations:** The centre has successfully developed sustainable formulations for coatings with different purposes.



Nylon coated – non coated



Stainless steel coated – non coated

Antifouling samples tested in PLOCAN facilities (PLataforma Oceánica de CANarias) according to ASTM 3623 regulation, in conditions of full immersion after 2 months.

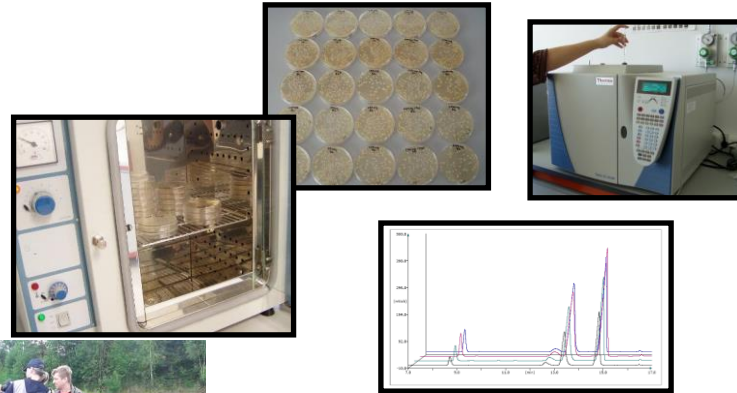
ZEROPOLLUTION-02: Bioremediation of Ukraine's ecosystems contaminated by conflicts (17/09/2026)

- **SORBENT:** Soil remediation technique for in situ cleaning of soils contaminated with heavy hydrocarbons mixtures. SME-2008-232533_ Partner **sorbent**

- **SORBENT-DEMO:** Demonstration of soil remediation technique for in situ cleaning of soils contaminated with heavy hydrocarbon mixtures. FP7-SME-CP-605607_ Partner



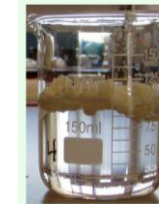
Gas Chromatography analysis and protocols:
hydrocarbons analysis on polluted soils,
determination of hidrocarbons as indicators



Buoyancy at 1st hour



Buoyancy at 24th hour



Buoyancy at 1st hour



Buoyancy at 24th hour

Oil retention
Water retention
buoyancy

Sorption ratio Based on **ASTM F726-99: Standard Test Method for Sorbent Performance of Adsorbents.**

Different RAW MATERIALS (including wastes and by products treated) to be used as adsorbents for HCs

Other pollutants:

Heavy metals
Organic contaminants
PFAS

Exsitu techniques:

NZVI/iron oxide
Sorbents: modified nanoclays
Optimized surface chemistry for short chain PFAS adsorption.



Advanced materials for pollutants removal from WASTE WATER

Nanomaterials with adsorption capacity:

- Multifunctional nanoresins CD/PAA for removal of specific pollutants: heavy metals and organic pollutants (e.g. PPCPs) from WasteWater.

Nano-resin formulations based on crosslinked poly(amidoamine)-based resins (CD/PAAAs).

These materials are biodegradable, biocompatible and non-toxic.

Polyamidoamines (PAA) are synthetic amino polymers obtained by Michael addition reaction of aliphatic primary amines or sec-diamines to bis-acrylamides.

Cyclodextrines (CDs) are cyclic oligosaccharides obtained from an enzymatic reaction of starch.

For the development of CD/PAA nanoresins, a synthesis process has been carried out where the unmodified CD acted as co-monomer in PAA synthesis producing CD/PAA cross-linked resins by Michael addition reaction.

- New elastomeric material for hydrocarbons removal

Absorbent material can absorb during the first 5 minutes, 573% its weight.

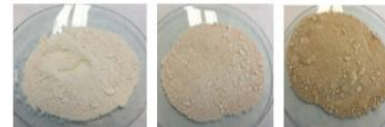
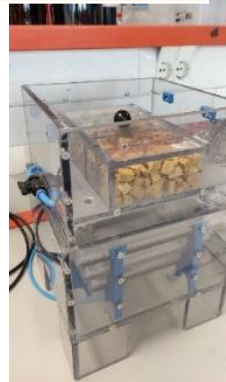
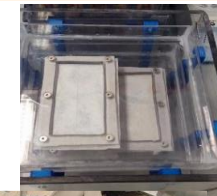
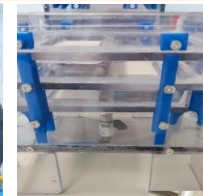
The material can be reused and the pollutant recovered.



Removal efficiencies for metal species (%)	Na > 80%; Cr > 90%; Cu, Zn > 95%; As > 20%
Resin capacity (mg metal per g resin)	85 mg of metal (Cu) per 1 g of resin
Optimum feed pH	Slightly basic (6 – 8)
Optimum flowrate	3L /hour (current conditions)

Nanomaterials with photocatalytic performance:

Metal doped and mixed oxide (e.g. V/TiO₂, Fe/TiO₂, Au/TiO₂, CuO/ZnO, CuO/TiO₂, black TiO₂) photocatalyst materials.



TiO₂-based photocatalyst

Magnetic recovery of adsorbents from Waste Water:

Fe oxides nanoparticles (Fe₃O₄ and Fe₂O₃)

easy separation from the reaction mixture by utilizing external magnets



LABORATORY and PILOT FACILITIES FOR TESTING

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