



RÉSEAU SATT



TECHNOLOGICAL INNOVATIVE SOLUTIONS FROM OUR GREENTECH PORTFOLIO



TECHNOLOGIES GREENTECH - MATERIALS



Recyclable Elastomers

Technology matured by



The solution provides precursors for the preparation of recyclable crosslinked diene elastomers having a low viscosity & being easy to integrate within the process.

#NoLossofProperties

#SiandBlackCinclusionOK

#Simple&LowcostChemistry

Main advantages of the technology :

- Low viscosity polymers that can be reversibly crosslinked by simple heat treatment
- Use of these low mass chains is facilitated (dissolution / washing / molding)
- Works in relatively mild reaction conditions, with no side reactions
- Excellent conversion rates of the 3 steps chemistry
- 5 cycles of recycling without observing loss of properties

Due to the low viscosity, the compounds allow the production of recyclable polybutadiene, polyisoprene, SBR, EPDM, Natural rubber and polychloroprene.





TECHNOLOGIES GREENTECH – MATERIALS

MAFOTOM

Technology matured by



New tunable bio-based (from tomato peels) thermoset elastomers with the following properties : recyclability, food contact & edible, good barrier properties to water & oxygen and shape memory

#Biosourced #Polyesters #Sustainability

Mafotom concept is to mimick cutin natural polyester networks of plant cuticles (waste peels from the tomato industry), to produce **hydrophobic elastomers through a sustainable process** (solvent-free, catalyst-free) from industrial waste.

This innovation could address the following markets: seals & packaging, grips, drug delivery and others...



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TECHNOLOGIES GREENTECH – MATERIALS



HydroPImem

Technology matured by AXLR



Hydrophilic polymeric membranes resistant to high temperature

#Membrane	#Temperature resistant

#Polyimide

New hydrophilic and temperature resistant polyimide-membrane capable of meeting the maintenance constraints of filtration systems like cleaning cycles operated at high temperature.

<u>Benefits</u> :

- Physical stability at high temperature
- High mechanical and thermal properties
- High water flux (1316 $L/m^{2}h$ observed up to the pressure of 3.5 bars)
- Aqueous mediated pathway synthesis
- Porous asymmetric morphology

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TECHNOLOGIES GREENTECH – MATERIALS





Pre-stressed assembly for wood, fibre and composite materials

#Pre-stressed assembly

#Wood - Composite

#Construction - Furniture

Pre-stressed connection system for structures made of fibrous materials such as solid wood, wood-based profiles or composites, bamboo, allowing the transmission of tensile or compressive forces by adhesion, without gluing or bolting.

The tensile or compressive forces are distributed uniformly in the material, thus optimising the connections both mechanically and aesthetically.







BETIC

Technology matured by **ERG**.\NEO

Biomass conversion process into biofuels using a photo-catalyst agent based on titanium dioxyde (TiO2).



A new biomass conversion process producing biogas and biofuels. Titanium dioxyde crystal are grown onto green wastes in a solvent-free process creating a photo catalyst-feedstock pair.

The degradation of the green wastes occurs during exposure to visible light irradiation. After total degradation, the recovered TiO2 is combined with new green wastes to form a new photo catalyst-feedstock pair, ready for the degradation step. This **efficient circular process** insures that TiO2 dissemination into the environment does not occur.





IRIDIO SOL



A new catalyst for PEM anode electrolyser

EnergyStorage

#HydrogenProduction

#ImprovedCatalystProperties

Innovative solution

This catalyst is spherical and a porous structure that improves the catalytic properties by maximizing the number of active surfaces thus helping to accelerate the dissociation reaction of water while participating in the better transportation of gas produced.

It is also possible to associate with this catalyst another material such as ruthenium as is common in this type of application.

Suggested applications

- Catalyst for anodes for PEM electrolyser
- Catalysts for chemical reaction
- Energy storage

Competitive advantages

- The new structure allows to optimize the catalyst properties by increasing the number of active surface
- The manufacturing process is easily reproducible



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Technology matured by



Innovative, transparent and colorless DSSC photovoltaic devices

#Photovoltaic	#Transparent	#Colorless

With TRANSITION technology, any transparent surface can become an electricity generating panel ! The performance of the panels does not depend on their inclination and multiple applications are therefore possible. The aesthetics of the final product is preserved thanks to the high level of transparency of the solution which makes it indistinguishable from ordinary glass.



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BATTERIE

Technology matured by PULSAL/S

Functional separators for batteries

#Separator

#Battery

#LIHITIUM ION

Stationary storage Lithium-ion technology has allowed considerable progress in performance, but challenges still need to be addressed to improve energy density power and life cycle in batteries. The technology proposed herein is focused on **the battery separators**.

With a simple modification of commercial separators lifetime and performances of batteries integrating those new membrane separators are greatly improved.

COMPETITIVE ADVANTAGES : Higher ionic conductivity and transport number, Lifetime increased cycling, Enhanced power, Better wettability prevents vacuum filling, Manufacturing compatible with existing processes, Relevant for any battery technology using porous separators



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TECHNOLOGIES GREENTECH - MANUFACTURING





Safety and green separation method between PVB and glass breakage to up-cycling PVB

#Recycling

#ChemicalProcess

PVB is a major polymer used in the car windshield or for building glazing. To be able to recycle it and to re-use for same products or anothers, will be a strong achievement.

The process consists to separate encrusted glass shards in the PVB. The process is the combination of ultrasound effect with a chemical tensio-actif. High quality of recycling PVB garanteed



Before traitment

After traitment

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TECHNOLOGIES GREENTECH - MANUFACTURING

HEATERS



Disruptive technology aiming at modifying thermoplastic resins under NIR irradiation

#Thermoplastics	#Debonding	#NIR Dyes

Using pure organic NIR (Near Infra Red) dyes as powerful heaters, researchers managed to apply the following processes to thermoplastic resins (with Tg < 150°C):

- Shaping
- Mounting
- Bonding/debonding
- Separation on demand
- Self healing
- Reprocessing

An industrial POC has already been reached for debonding on demand adhesives for electronics.



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TECHNOLOGIES **GREENTECH -- ENVIRONMENT**



CARE CH4

Technology matured by SATT



LIDAR solution for remote methane emissions monitoring based on a unique laser solution

#Laser

#LIDAR detection

#CH4 leak monitoring

We develop a differential absorption LIDAR for remote methane leak quantification and mapping, offering following advantages :

- Precision methane concentration measurement
- Permanent real-time monitoring of large areas
- Anticipation of plume propagation thanks to simultaneous wind measurement

The LIDAR for real time remote methane sensing offers a powerful solution for :

- Reliable methane fugitive emissions measurement
- Fast methane leak detection, localization and guantification, improving • safety of personnel on site





TECHNOLOGIES **GREENTECH -- ENVIRONMENT**



SENSFEEDER

Technology matured by



An autonomous and efficient pico-turbine for the monitoring of water networks, source of sustainable energy for IoT sensor

#FluidicNetwork

#SensorSupply

#WaterMonitoring

A new regulation will force massive and systematic monitoring of water networks to control leaks or harmful chemical elements. This requires the installation of a dense network of sensors connected everywhere, even at remote locations of the electrical network.

Sensfeeder is the solution to provide sustainable energy to these sensors. **The pico-turbine** is simple and robust and requires no maintenance. As a non-bypass system, it prevents accidental overflow. It is protected against theft and impact. It is compatible with any existing piping system and can be installed in corrosive environments. The power range is from 2 to 10 watts and can be customized according to the flow rate and the need.



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TECHNOLOGIES GREENTECH – MOBILITIES





Discrete-event simulator of an electric vehicle charging network

#EVMobility

#SmartGrid

#Simulation

DESEVNET is a composite software, modular and easily deployable, allowing a user to evaluate the impact of certain configurations on the general performance of a network of electric charging stations.

Thanks to this application, it is now possible to measure the impact of a distribution of agents and electric vehicles coming to use a fictitious network more or less intensively, through various metrics : average charging power per shutdown, average energy produced per shutdown, or per journey, average residence time, curves tracing the evolution of charging powers, charging efficiency, etc...





Want to know more about our other innovative solutions ?

Contact us to discuss about your innovation needs and know more about how we transform public research into industrial innovative solutions





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