polykey

CATALOGUE 2024

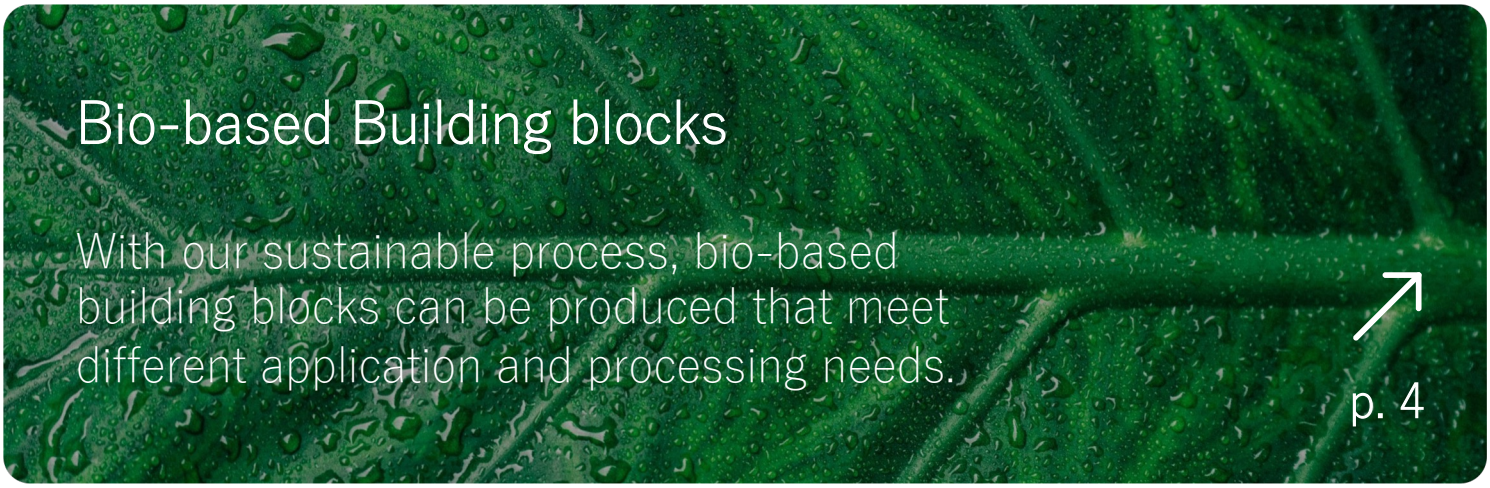
www.polykey.eu

About us

POLYKEY is a science-driven company born in 2020 as a spin off from the POLYMAT Institute and the University of the Basque Country (UPV/EHU). Rethinking the polymer industry, POLYKEY aims to promote the sustainability of materials, from its sourcing to manufacturing, use and recycling.

POLYKEY offers products and technologies for a wide range of applications to reduce their carbon footprint, boost their performances and contribute to the circular economy. The products and technologies can be classified into three key areas: bio-sourced polymers, plastic recycling and innovative materials for energy storage.

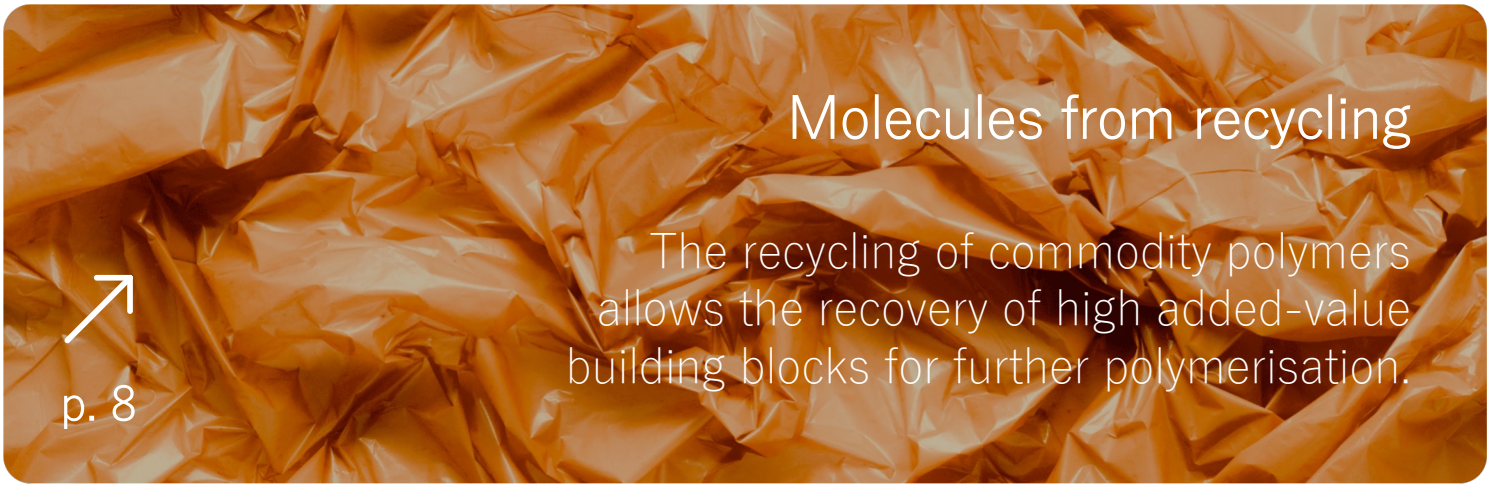
International researchers with expertise in organic chemistry, polymer materials, and biology are constantly working on improving our products for customers and strategic partners. POLYKEY is committed to help the plastic industry achieving its sustainable goals on bio-sourced products, chemical recycling processes and innovative materials for energy storage.



Bio-based Building blocks

With our sustainable process, bio-based building blocks can be produced that meet different application and processing needs.

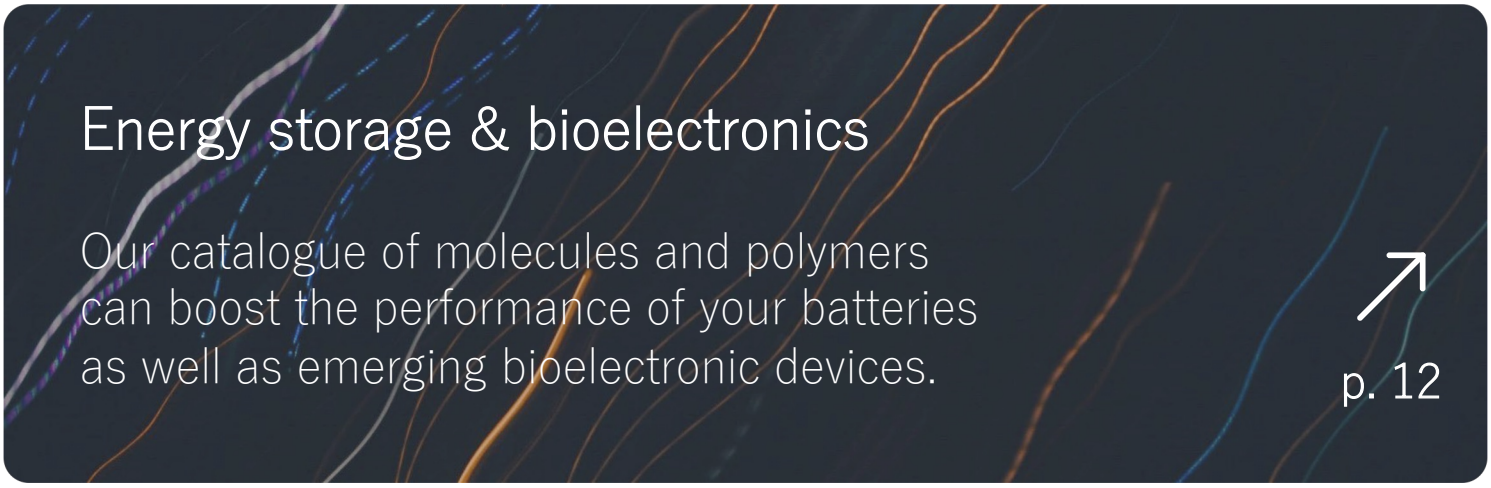
p. 4



Molecules from recycling

The recycling of commodity polymers allows the recovery of high added-value building blocks for further polymerisation.

p. 8



Energy storage & bioelectronics

Our catalogue of molecules and polymers can boost the performance of your batteries as well as emerging bioelectronic devices.

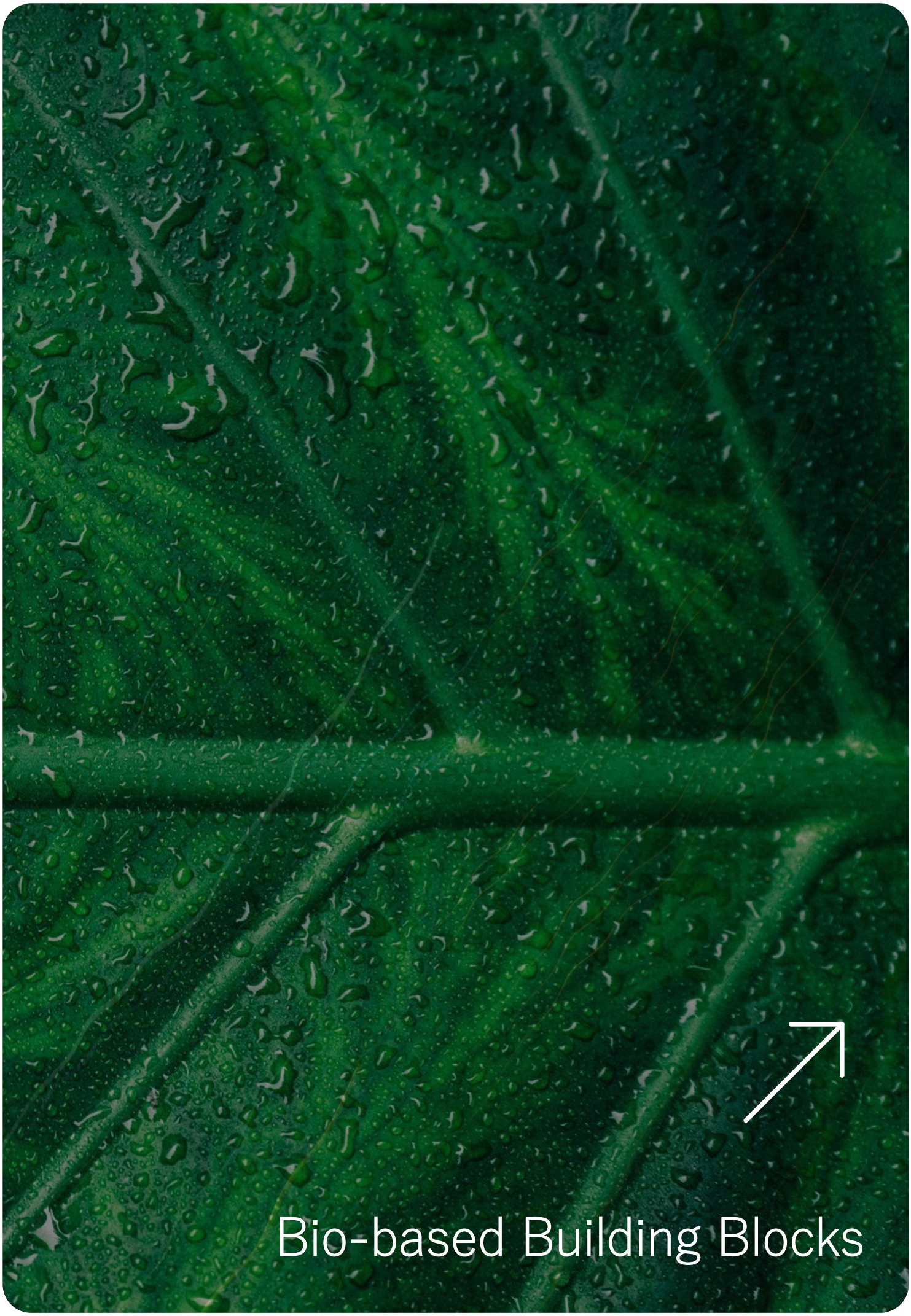
p. 12

Services

To move from a linear plastic economy to a circular production, we offer tailored products and on-demand services.

p. 21

For assistance about orders, quotations or any other question or remark, please do not hesitate to contact our Customer Service Department at info@polykey.eu


Bio-based Building Blocks

POLYETHER POLYOLS

Through an innovative and sustainable process, our **bio-based polyether polyols** are synthesised to meet different application and processing needs.

Applications

...

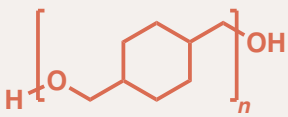
Manufacturing of polyurethanes, poly(ether-esters) and poly(ether-amides).

PK01

PK02

PK03

PK04



PK05

PK06

POLYETHER POLYOLS

All our polyether polyols can be prepared in the range of M_n = 500 – 2000 g·mol^{-1} and are certified with < 500 ppm of water.

Product	Functionality	T_m (°C)	Viscosity @ 40 °C (cPs)	OH value (mgKOH·g^{-1})
PK01	1.7	55	Solid	40
PK02	1.8	68	Solid	36
PK03	2.0	80	Solid	32
PK04	2.0	85	Solid	30
PK05	4-5	-	11 500	260
PK06	1.9	16	900	58

The values shown above are typical values, not guaranteed values. Viscosity and OH value are determined for polyethers of M_n = 2000 g·mol^{-1}.

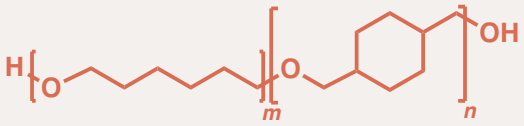
Properties

- High bio-based content (>95%)
- Environmental-friendly technology
- High reactivity (bi-functional primary alcohol)
- Superior hydrolytic stability
- Tunable crystallinity

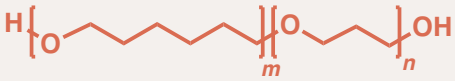
ON-DEMAND POLYETHER

On-demand co-polyether polyols

Our technology allows to prepare on-demand co-polyether polyols with tuned properties for meeting your application and processing needs.



PK(01-*co*-05)



PK(01-*co*-06)

Functionalised polyethers

Functionalised polyethers of defined length are also available. Do not hesitate to contact us for any specific demand.

Methacrylated PK01

Aminated PK06


Molecules from Recycling

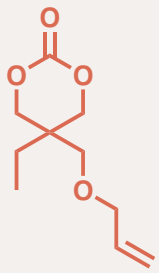
CYCLIC CARBONATES

Our unique technology of recycling of commodity polycarbonate (BPA-PC) leads to the synthesis of **cyclic carbonates**.

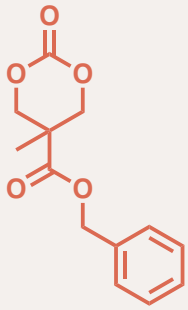
Applications

...

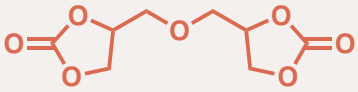
New building blocks for the synthesis of innovative polymers.



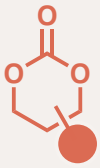
RK02 02



RK02 03



RK02 04



Functionalised 6-member cyclic carbonates

...

Innovative building blocks obtained from the recycling of BPA-PC are available on-demand.

Ask for your quotation!

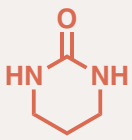
UREAS

Our unique technology of recycling of commodity polycarbonate (BPA-PC) leads to the synthesis of **cyclic and linear ureas**.

Applications

...

Batteries, 3D printing, NIPUs, biomedicine or electronics, polyurethanes, catalysis.



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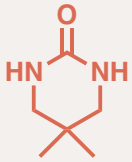
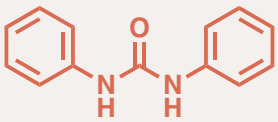
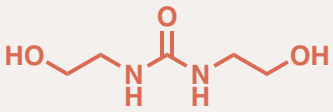


RK02 06



RK03 01



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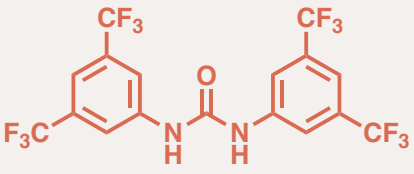


RK03 03

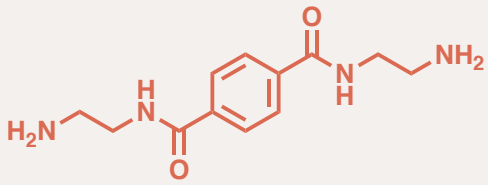
TEREPHTHALIC DERIVATIVES

The treatment of poly(ethylene terephthalate) (PET) with appropriate reagents allow the synthesis of innovative aromatic structures.

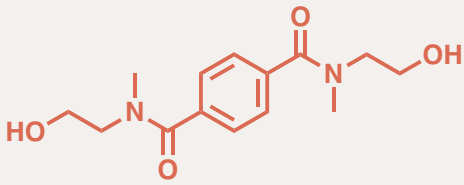
Applications

...

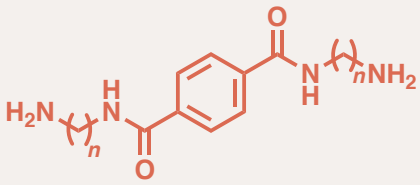
New building blocks for the synthesis of innovative polymers.



RK04 01

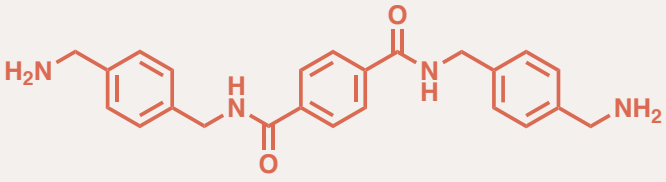


RK04 02

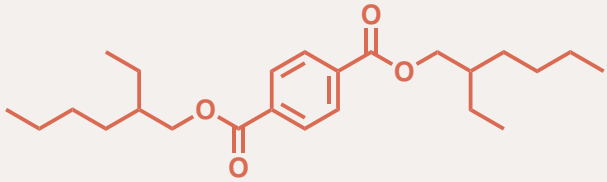


RK04 03-0X

Name	*n*
RK04 03-01	2
RK04 03-02	4
RK04 03-03	6
RK04 03-04	8



RK04 03-05



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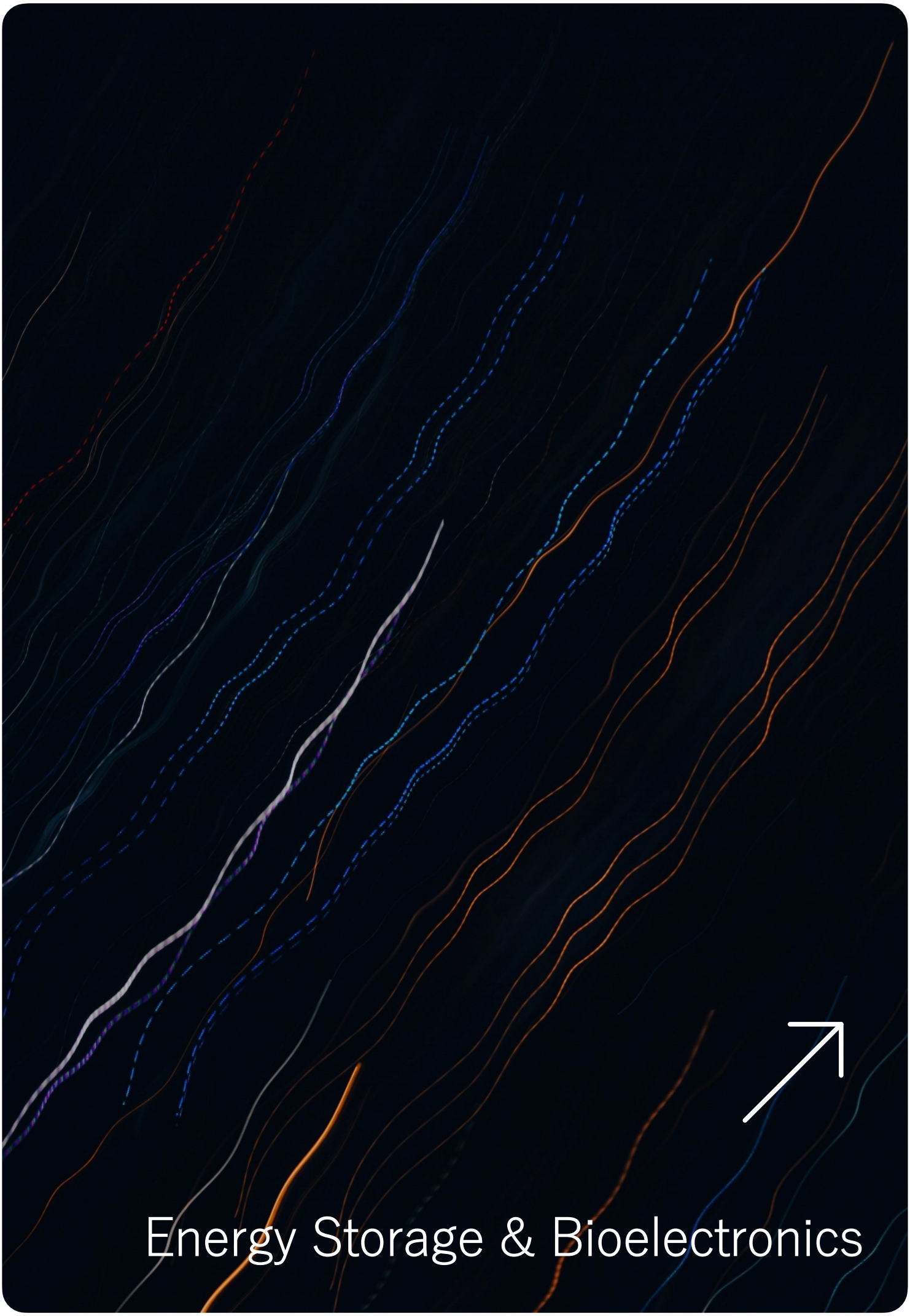

Energy Storage & Bioelectronics

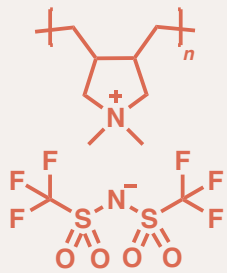
POLY(DADMA) POLY(IONIC LIQUID)S

Poly(DADMA) with various counter anions. Available with M_n = <100 000, 200 000 – 350 000 or 400 000 – 500 000 g·mol^{-1}.

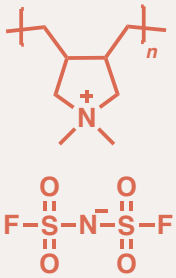
Applications

...

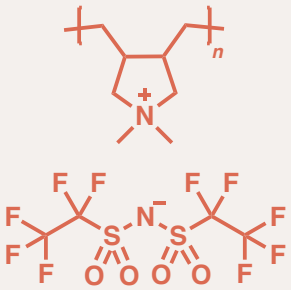
Polymer electrolytes and functional binders compatible with high voltage cathodes for Li-ion batteries.



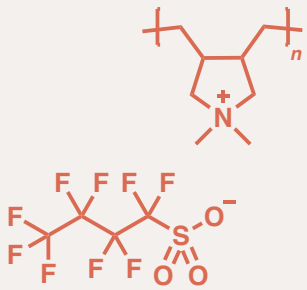
EK01 01



EK01 02



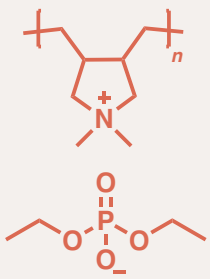
EK01 04



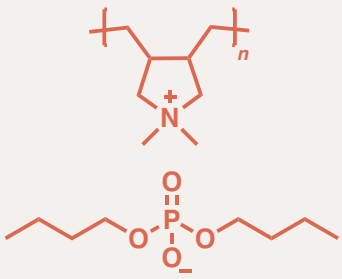
EK01 06

POLY(DADMA) POLY(IONIC LIQUID)S

New fluorine-free poly(DADMA) specifically designed for binders compatible with all types of temperatures.

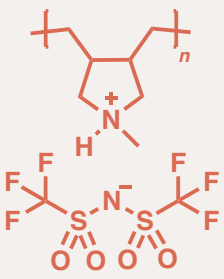


EK01 07

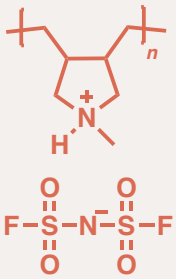


EK01 08

New category of poly(DADMA) conceived for the performance of innovative **hydrogen technologies**.



EK01 09



EK01 10

SINGLE-ION CONDUCTING POLYMERS

Sulfonamide and **sulfonate single-ion conducting polymers** specifically designed for Lithium, Sodium or Potassium batteries.

Applications

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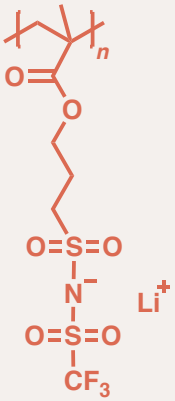
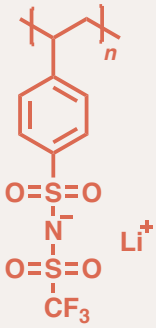
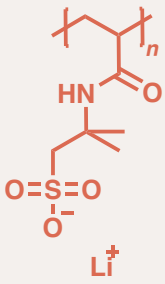
Polymer electrolyte for solid-state batteries. Also available with Na and K ions.



EK02 02



EK02 03



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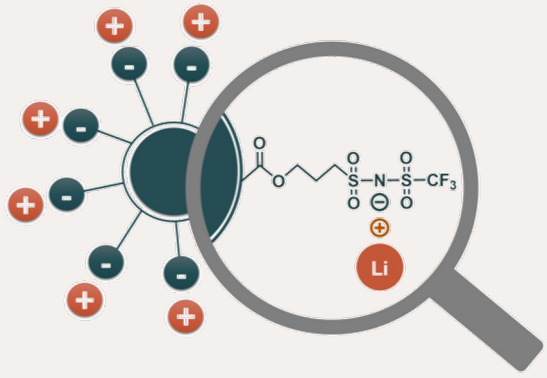


Nanoparticles of single-ion conducting polymers

...

- Size range 30 – 60 nm
- Polymer core of Poly(methyl methacrylate) (PMMA) or polystyrene (PS)
- Variable composition of Lithium sulfonamide co-monomer

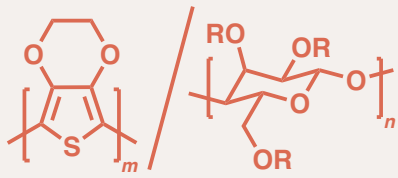
PEDOT/BIOPOLYMERS

Aqueous dispersions of conducting polymers based on **PEDOT** and **water-soluble biopolymers**.

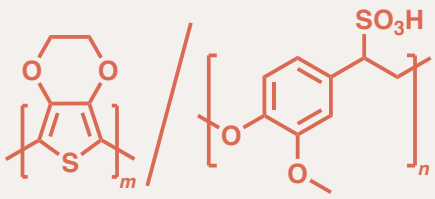
Applications

...

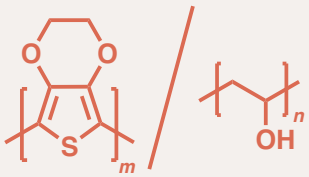
Conductive additives and water-soluble binders.



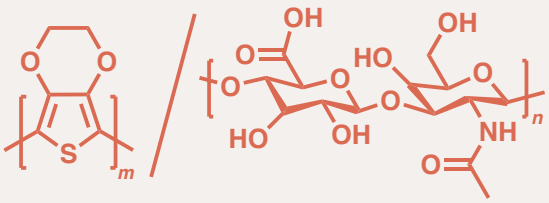
EK04 01
PEDOT/Carboxymethyl cellulose



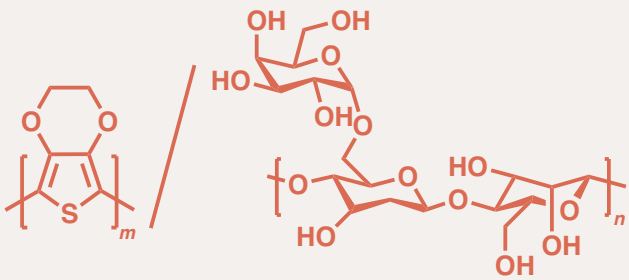
EK04 02
PEDOT/Lignin sulfonate



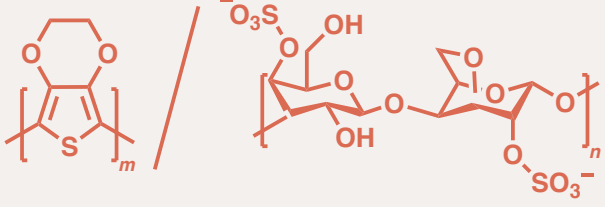
EK04 03
PEDOT/Polyvinyl alcohol



EK04 04
PEDOT/Hyaluronic acid



EK04 05
PEDOT/Guar gum



EK04 06
PEDOT/Carrageenan

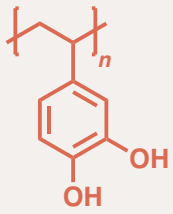
REDOX POLYMERS

High voltage biocompatible **poly(catechol)** polymers for energy storage and bioelectronics.

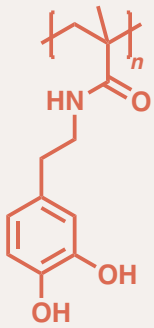
Applications

...

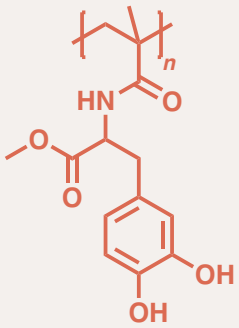
Organic electrodes, redox-active binders and redox flow batteries, biocompatible coatings.



EK03 01



EK03 02-01



EK03 02-02

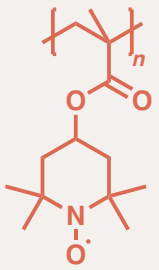
REDOX POLYMERS

TEMPO-based polymers and stable redox polymers including **poly(anthraquinoyl sulphide)** or **napthtalenic poly(imides)**.

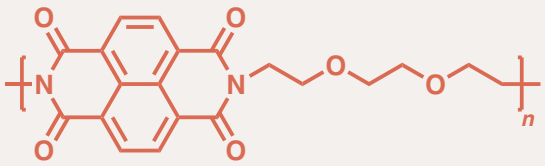
Applications

...

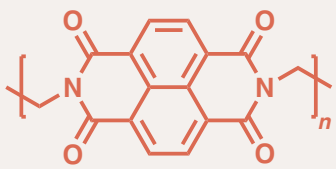
Organic electrodes, redox-active binders and redox flow batteries.



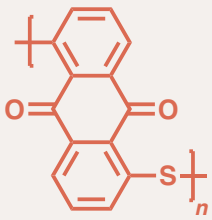
EK03 03



EK03 04



EK03 05



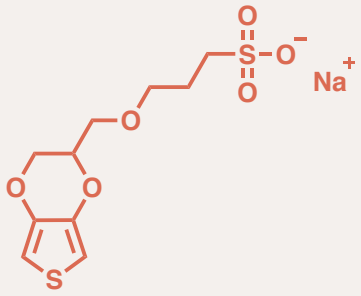
EK03 06

THIOPHENE-BASED MATERIALS

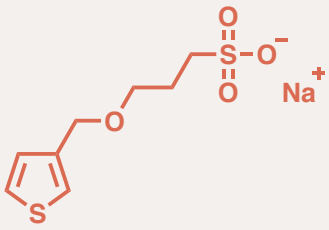
Water soluble anionic and cationic thiophene-based monomers and polymers.

Applications

Electronic conductive materials for (bio)electronics.



EK05 01



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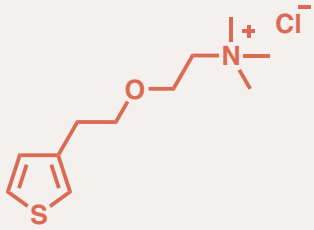

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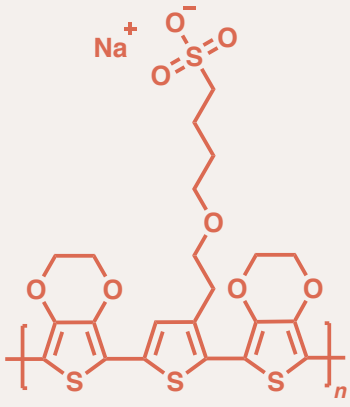


EK05 03

On-demand Trimer

Thiophene-based trimers can be synthesised on-demand for meeting your requirements.

- Length of the glycol chain
- Anion or cation
- Nature of the counterion
- ...

IONIC MOLECULES

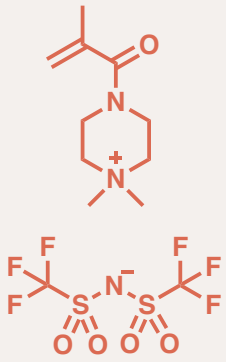
Specialty ionic molecules for high-added value applications including energy storage, bioelectronics and energy harvesting, among others.

Applications

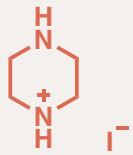
...

Membranes, solar cells, sensors, deep eutectic solvent, redox-flow batteries.

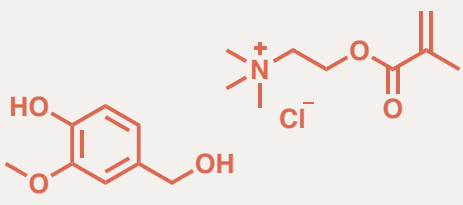
EK06 01



EK06 02



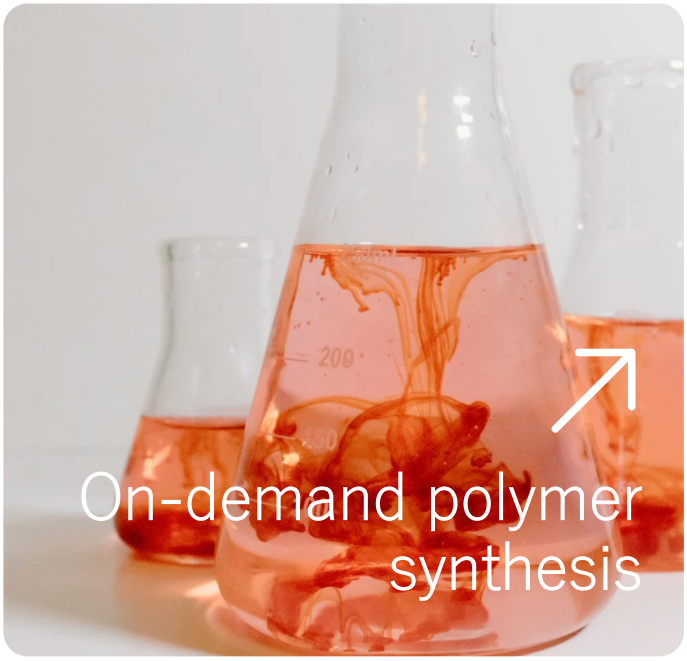
EK06 03



EK06 04

Services

To move from the current unsustainable linear plastic consumption to a circular economy, we offer tailored products and on-demand services.



On-demand polymer synthesis

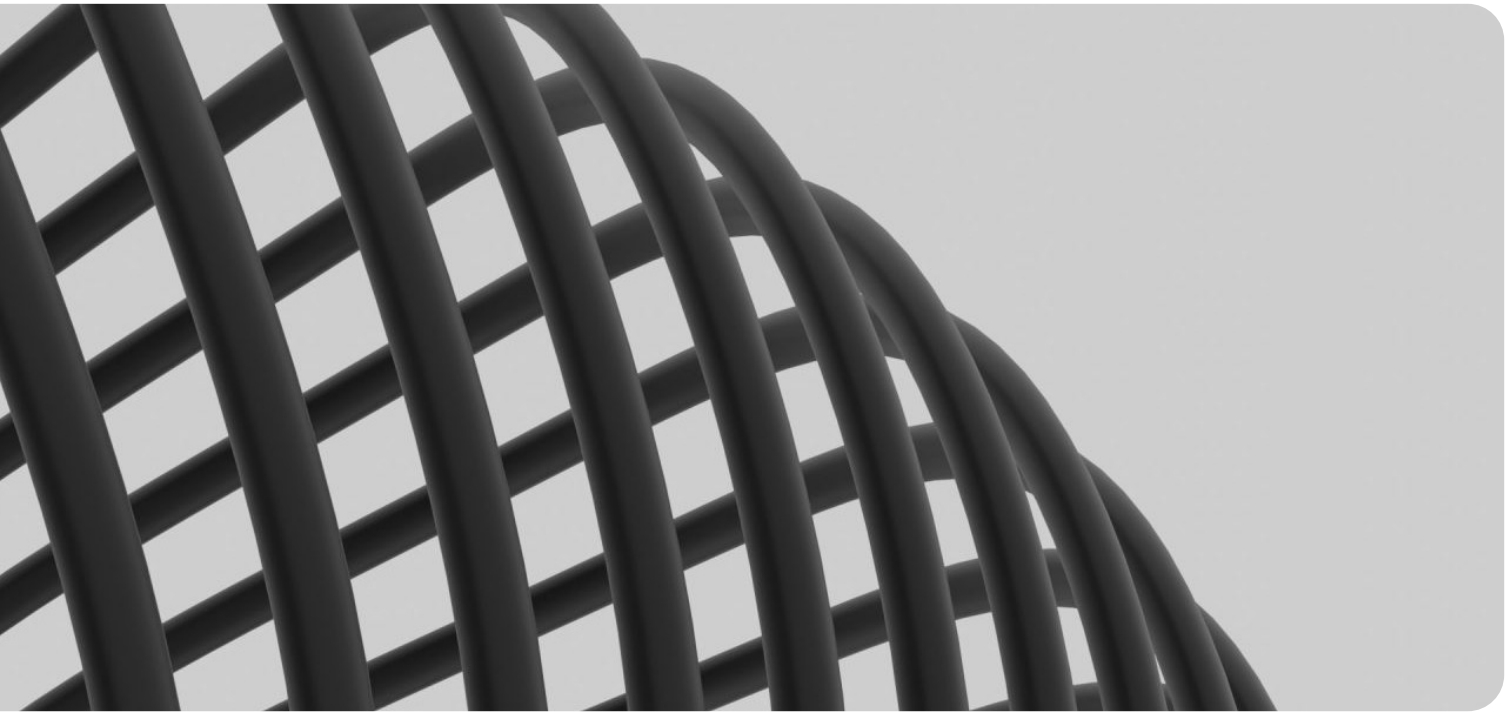
Our scientific supervision is counting with an experience of more than 25 years in the synthesis of polymers and materials for valuable applications, including batteries, bioelectronics, bio-sourced materials, NIPUs, block polymers, etc.

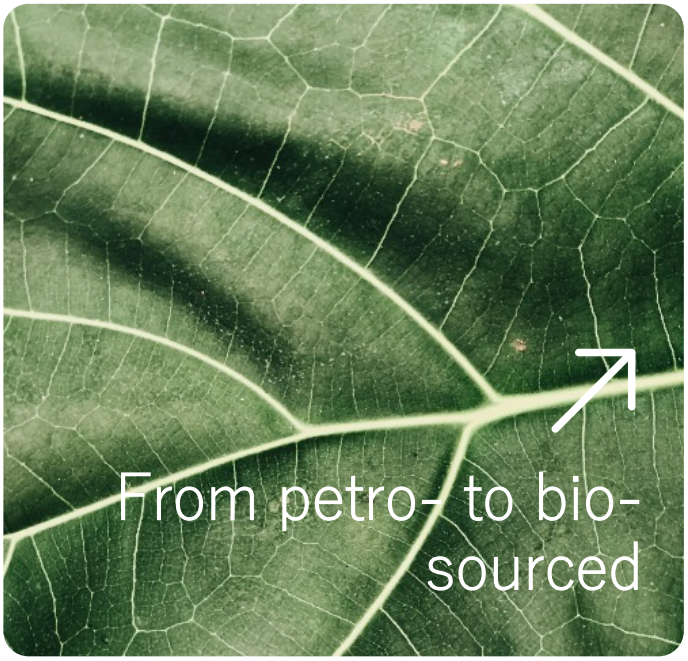
- Functional polymers
- Polymers from renewable resources
- Polymers for bioelectronics

Recycling plastic wastes

With a solid expertise in recycling methodologies and two registered patents, POLYKEY is your expert in depolymerisation for developing a tailored recycling reaction under mild conditions.

- Recycling of blends and multilayers
- Analysis of plastic waste composition
- Recycling of a plastic or a mixture
- Eco-design for better recycling

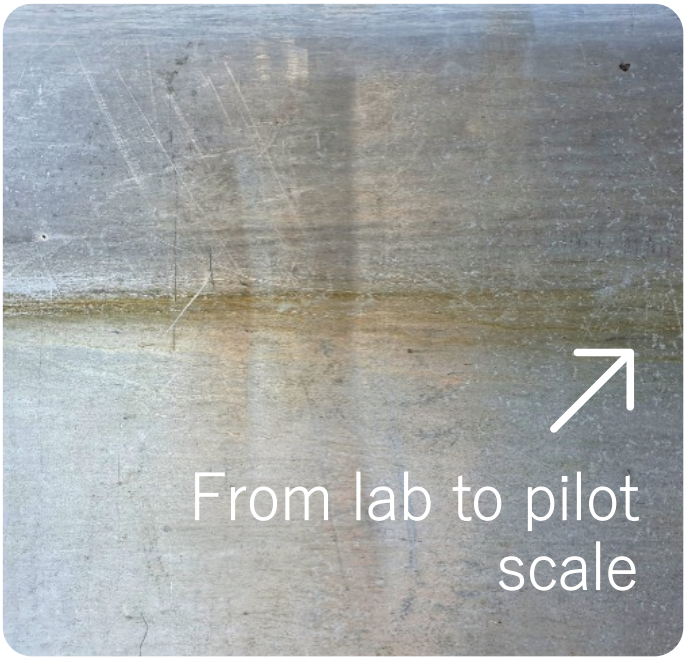




From petro- to bio-sourced

Want to improve the sustainability of your product or technology? POLYKEY can help you on adapting your methodologies for improving your overall impact.

- Use of bio-sourced synthons
- Change for organocatalysis
- Eco-design for improved assessment
- Sustainable improvement of processes



From lab to pilot scale

With partially automatised pre-pilot and pilot equipment, we are experts in the scale up of polymerisation and depolymerisation reactions from gram to kilogram scale.

- Capacity up to 35 L
- Glass and metallic reactors
- Automatised system
- High vacuum and temperatures

Polymer solutions for a sustainable future

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