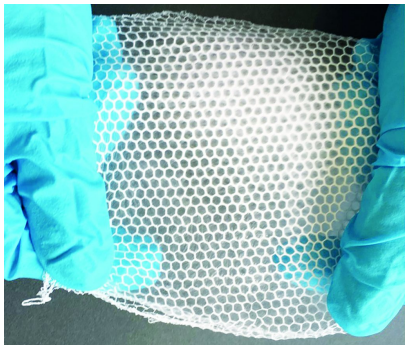
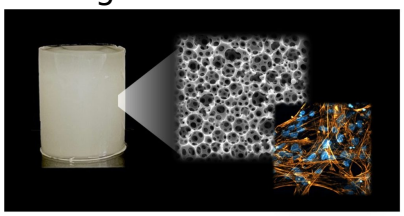
As an integral part of the CESAM research unit and the Department of Chemistry at the University of Liège, CERM has established expertise in the design, synthesis and processing of innovative polymer materials for healthcare and sustainable industrial applications. Its research combines fundamental polymer chemistry with applied materials science, addressing major challenges in personalized medicine, advanced medical devices and the ecological transition of the chemical industry.

CERM's research is structured around two complementary areas: the development of innovative biodegradable and bio-based materials, and the design of more sustainable polymerization processes and plastics. Its expertise encompasses ring-opening and step-growth polymerization, organocatalysis, solvent-free and resource-efficient synthesis, polymer formulation, characterization and processing. This integrated approach enables CERM to develop materials with controlled properties, improved biodegradability or recyclability, and reduced environmental impact.

A distinctive feature of CERM is its FRITCO$_2$T platform, dedicated to the transformation and valorization of carbon dioxide into low-carbon-footprint polymer materials. The platform supports the development of coatings, adhesives, foams and biomaterials derived from CO_2, while providing the capacity to produce kilogram-scale quantities for prototyping and industrial validation. This combination of CO_2 chemistry, polymer synthesis and processing makes CERM a valuable partner for companies seeking to develop more sustainable materials and production routes.



Biodegradable membrane for tissue reconstruction - © CERM



Polyphosphoester scaffolds for tissue engineering. © CERM

CERM is deeply involved in European collaborative research programs, working with universities, research centers and companies to accelerate the development and industrial uptake of innovative polymer technologies.

Through INTERREG Mosa-Rhine projects, it contributes to cross-border research and innovation initiatives involving SMEs and industrial partners in the European region. CERM has coordinated the IN FLOW technology platform, which focuses on the flow formulation of biodegradable materials for food, biomedical and healthcare applications. It also coordinates the PolyDREAM project, dedicated to the design of degradable polymers and greener materials for additive manufacturing. This project supports the development of Industry 4.0 in the cross-border regions, with particular attention to SMEs active in healthcare and biotechnology. Fabot, 3DMaastricht, Iamfluidics, Fibrothelium, Meotec and Tenco are among the industrial and technological partners involved in this market-oriented research program.

CERM also participates in Medi4Future, an Interreg North-West Europe project dedicated to reducing hospital waste through more sustainable healthcare practices and innovative material solutions. By contributing its expertise in polymer chemistry, biodegradable materials and sustainable processing, CERM supports the development of approaches aimed at reducing the environmental footprint of healthcare activities. This project complements CERM’s research on sustainable materials and strengthens its involvement in European initiatives addressing the circular economy and the ecological transition of the healthcare sector.

Advanced medical devices represent another major research direction. CERM participated in the INTERREG PolyValve project, which aimed to develop innovative polyurethanes for the fabrication of heart valves by additive manufacturing. Its involvement in the European Research Council-funded PV-Coat project, dedicated to the coating of heart valves, also contributed to the creation of CM4Cure, a spin-off company. These activities illustrate CERM’s ability to connect advanced polymer chemistry with medical device development and technology transfer.



CO2- and bio-based non-isocyanate polyurethane foams. © Jean-Louis Wertz



Design of implants for vaginal, cardiac, dental and ophthalmology applications. © CERM

The laboratory is also actively involved in the European Marie Skłodowska-Curie doctoral network D-Carbonize. D-Carbonize aims to combine CO_2 chemistry with bio-based resources to develop the next generation of greener and circular polymer materials. These networks strengthen CERM's European research partnerships while contributing to the training of highly skilled researchers in sustainable polymer science.

CERM's research is further supported by participation in the ERDF-funded UP-PLASTICS project, which investigates non-isocyanate polyurethane (NIPU) foams for thermal and acoustic insulation for the construction sector, as well as electromagnetic interference (EMI) absorbers. Additionally, CERM is involved in a WEL-T Advanced Grant project funded by the WEL Research Institute. This latter project investigates the development of innovative strategies for producing recyclable, self-blown NIPU foams from room-temperature formulations that can be applied to existing industrial foaming infrastructures. Research outputs from these two programs have enabled CERM's involvement in a Horizon Europe Innovation Action project, HIBISCUS, led by SOPREMA, to develop and validate thermal insulating NIPU foam panels for the construction sector.

CERM has developed extensive industrial partnerships with major companies, including Solvay, Solvin, CRM, Saint-Gobain, UCB, DuPont, Bayer, Chanel and TESA, as well as numerous SMEs. Its expertise in polymers for healthcare has benefited companies such as Physiol (BVI), Kiomed-Pharma, Hyloris and Wishbone. The laboratory has also contributed to the creation of start-ups, including EyeD Pharma, based on the development of drug-eluting implants for ocular diseases.

Building on its expertise in polymer synthesis, characterization, formulation and processing, CERM is developing innovative biomaterials and medical devices through advanced technologies such as electrospinning, additive manufacturing and supercritical CO_2 processing. These approaches support the development of scaffolds for cellular regeneration, medical implants and sterile devices with anti-inflammatory properties.

CERM has also patented scalable production processes for recyclable, self-blown non-isocyanate polyurethane foams and their related products, with the objective of bringing these technologies to market in collaboration with industrial partners.

With its multidisciplinary expertise, state-of-the-art equipment for polymer synthesis, characterization and processing, European research networks and dedicated CO_2 valorization platform, CERM provides a strong basis for collaborative innovation. It is well positioned to support European companies in the development of sustainable polymer materials, advanced healthcare technologies and competitive solutions for the ecological transition.



Fluorescent non-isocyanate polyurethane foams for sensing applications. © Jean-Louis Wertz

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