In partnership with:

Innovative Polymers For Healthcare

RÉSUMÉS DE CONFÉRENCES
BOOK OF ABSTRACTS

IP4H
INNOVATIVE POLYMERS FOR HEALTHCARE



25 & 26 mars 2026
25 & 26 March 2026

Institut Charles Sadron, Strasbourg

sfip Société Française des Ingénieurs des Plastiques

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POLYMERIS

PROGRAMME 25 MARCH 2026

9:00	**WELCOME COFFEE**
9:30	**Congress Opening**

SESSION SUSTAINABILITY

Chairpersons : Nolwenn STEPHAN – NEMERA & Cécile BALLOFFET – CELANESE

9:40	**KEYNOTE - Recycling of medical injection devices: a matter of collaboration!** **Christian POMMEREAU** - SANOFI – **Matthew DWYER** - LILLY France - **Laurence BOURET** - DASTRI
10:15	**Reimagine drug delivery devices with polycarbonates** **Christopher SCHIRWITZ, Jean-Claude CLERGUE** - COVESTRO
10:40	**Sustainable Healthcare Solutions through eco-efficient design** **Emmanuel BOXUS** - BOREALIS
11:05	**Presentation of the exhibitors - 2 min 2 slides**
11:25	**COFFEE BREAK**
12:10	**Impact of material and geometry on pH stability of bicarbonate-buffered media for cell therapy applications** **Jean Baptiste BRUCKNER** - SARTORIUS
12:35	**Chances and Limitations in the Use of New Biopolymers in Healthcare Products** **Julian LOTZ** - BIOVOX
13:00	**KEYNOTE - Structuring a 3D printing platform in a hospital: Experience at Brest University Hospital** **Samuel GUIGO** - CHU DE BREST
13:35	**LUNCH**

SESSION STERILIZATION & IA

Chairpersons : Florian COTIN – CERTECH & Sophie ROUIF – IONISOS

15:05	**YOUNG TALENT ZOOM** **Portable Spray Device for Rapid Deposition of Antimicrobial Polyelectrolyte Coatings** **Yijie LI** - SPARTHA Medical
15:25	**Medical Polymer Sterilization methods** **Pierre DEL POZO** - **Hans DE BROUWER**, - SABIC
15:50	**Gamma/E-beam to new X-Rays: How to compare radiation sterilization technologies on PP, PE and PET?** **Nicolas LUDWIG[1], Sophie ROUIF[2],** *Flavie PETROS[2], Emma SLIWAK[2], Belkacem OTAZAGHINE[3], Rodolphe SONNIER[3], Aurelie TAGUET[3], Helene GARAY[3], Florent KUNTZ[1], Yves BAYON[4]* 1: Aerial, 2: Ionisos Mutual Services, 3: Institut Mines Telecom - Mines d'Alès, 4: Medtronic
16:15	**Machine Learning platform to assess materials performances after Gamma and X-Ray sterilization** **Hakim BOUT** - SARTORIUS
16:40	**COFFEE BREAK**
17:25	**Innovative bioabsorbable filaments for 3D printing: use cases in tissue engineering applications** **Julien PAYEN**– LATTICE MEDICAL
17:50	**Introduction to the session Innovative Materials : Medical Plastics - A Technical Review** **Florian COTIN**- CERTECH
18:15	**End of the 1st day**
19:45	**Cocktail reception in Strasbourg**



MERCREDI 25 MARS
WEDNESDAY 25 MARCH



KEYNOTE

RECYCLING OF MEDICAL INJECTION DEVICES: A MATTER OF COLLABORATION!

Christian POMMEREAU - SANOFI › christian.pommereau@sanofi.com
Matthew DWYER - LILLY France › dwyer_matthew@lilly.com
Laurence BOURET – DASTRI › aurence.bouret@dastri.fr

Recypen is a unique french initiative dedicated to the collection and recycling of needle free medical devices used in chronic treatments, such as insulin pens.
the program is based on a cross industry collaboration between lilly, sanofi and dastri, bringing together pharmaceutical companies, a healthcare eco organization and retail pharmacies.
Its objective is to consolidate small volumes of complex, specialized plastics from medical devices across thousands of collection points in france.
this creates a real opportunity for plastics engineers to address the challenge of recycling multi material healthcare products.
Recypen is built on three core principles: it is collective, it is local, and it relies on an existing national collection network.
All processing and recycling activities are carried out in france, supporting a circular economy approach in healthcare plastics.
The main challenges include patient and healthcare professional engagement, education, and the recycling of complex medical devices, but the program demonstrates that innovation is possible when industry partners work together.



MERCREDI 25 MARS
WEDNESDAY 25 MARCH



SESSION SUSTAINABILITY

REIMAGINE DRUG DELIVERY DEVICES WITH POLYCARBONATES

Christopher SCHIRWITZ – COVESTRO › christopher.schirwitz@covestro.com
Jean-Claude CLERGUE – COVESTRO › jean-claude.clergue@covestro.com

Healthcare faces a critical dilemma: the increasing use of single-use medical devices is essential for access to medications and patient safety, yet contributes significantly to medical waste and environmental impact. Medical devices must meet stringent quality and safety standards, including biocompatibility, durability, and chemical resistance, traditionally achieved through complex multi-material designs. This approach, while ensuring performance, creates products that are difficult to recycle.

To address this challenge, we introduced our first innovative and sustainable drug delivery device concept in the year of 2022 — an all-polycarbonate design that streamlines disassembly, sorting, and recycling after use. Since then, we have collaborated closely with partners and customers to further enhance the concept and expand our material offerings for next-generation drug delivery devices. Our advancements range from low-friction polycarbonates for improved component movement to highly durable housing materials for reusable devices designed to endure multiple lifecycles.

Polycarbonates offer superior performance of drug delivery devices because they show higher toughness, stiffness, dimensional stability, and heat resistance than many competitive thermoplastics. Applied in the right way, polycarbonates allow for a reduction of device complexity, e.g. a reduced number of parts and reduced wall thickness because of their properties as engineering plastics.

By reimagining material selection, our 2025 version of the drug delivery device concept now works with just a single sort of plastic: transparent Makrolon® polycarbonate which marks a milestone in this field of applications. The concept demonstrates a mono-material approach allowing for direct recycling of all plastic components without prior disassembly and sorting. In addition, polycarbonate scrap recovered from transparent devices can be used in a broad range of applications and colors in a second-life cycle which makes this scrap a valuable raw material.

Furthermore, Covestro polycarbonates can be made available with renewable-attributed content, including grades for medical applications. Following the mass-balance approach up to 89% sustainable share can be achieved replacing fossil-based raw materials with alternative raw materials in the production process. Materials with renewable content support the creation of devices with a significantly reduced carbon footprint which means starting with a more sustainable material as early as in the first lifecycle of a device.

In combination, polycarbonates made from alternative raw-materials and the many options to design for reusability, reduced material consumption, and recycling create a new pathway to more sustainable devices that don't compromise on quality or patient safety.



MERCREDI 25 MARS
WEDNESDAY 25 MARCH



SESSION SUSTAINABILITY

SUSTAINABLE HEALTHCARE SOLUTIONS THROUGH ECO-EFFICIENT DESIGN

Emmanuel BOXUS – BOREALIS > emmanuel.boxus@borealisgroup.com

Borealis has been a trusted partner in supplying advanced polyolefins for medical devices and pharmaceutical packaging for over 25 years. The Bormed™ Concept is based on service, commitment, and compliance, supporting innovation with strong regulatory and technical expertise. The Bormed™ product range offers high safety and quality, with Borealis ensuring reliable global supply.

Legislative Context and Changes

The importance of eco-efficient design in healthcare applications is increasingly recognized. The Packaging and Packaging Waste Regulation (PPWR) is set to replace the directive from 1994, aiming to reduce packaging and packaging waste while introducing "design for recycling" as a central principle. Although the use of post-consumer recycled (PCR) materials will become mandatory, registered healthcare applications are currently exempt. However, since food contact applications are included within the regulation's scope, it is likely that healthcare applications may also be subject to these requirements in the future. Beyond PPWR, pressure on OEMs and converters to improve recyclability by reducing the use of chemicals of concern, such as PVC, is increasing. Consequently, these trends require polymer producers to develop concepts to support the transformation towards eco-efficient design.

Eco-efficient design guidelines

Borealis has established a comprehensive set of Eco-efficient design guidelines. Several practical examples demonstrate the application of these guidelines, illustrating how the benefits of polyolefins can enhance Eco-efficient design and optimize product performance while reducing environmental impact. One particularly important example is constituted by Mono materials, which play an important role in eco-efficient design. Mono materials – as opposed to multi-material solutions and laminates – can be fully recycled without the need for prior separation treatments. Within mono materials, polypropylene (PP) plays a particularly important role, because adequate waste sorting and treatment facilities are already in place across most of Europe. Therefore, PP is a preferred material in various medical packaging applications. Moreover, the absence of chemicals of concern, such as chlorine, further strengthens the case for PP in material selection.

Mono-material Polypropylene blister packs, example of Eco-efficient design

Polypropylene (PP) mono-material blister packs have demonstrated reliability for over 30 years, fulfilling the application requirements of specialized markets since their inception. Historically, traditional mono PP was limited to low-barrier applications; however, evolving market demands now require mono-material solutions suitable for the medium-barrier segment. This shift presents an opportunity for Borealis to develop innovative mono-material solutions that meet enhanced barrier requirements, while also improving processability via an expanded thermoforming window.

Borealis initiated comprehensive engagement across the value chain, carefully evaluating unmet needs within the industry. As a result, Borealis developed a solution enabling PP to address mid-barrier market requirements while broadening its thermoforming capabilities.

In collaboration with Novartis, Borealis conducted extensive testing and gained valuable insight into the OEM's requirements and selection criteria. This process facilitated the identification of the optimal candidate among various prototype grades for confirmation testing. The outcomes of these prototype evaluations will be presented and analyzed.



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SESSION SUSTAINABILITY

IMPACT OF MATERIAL AND GEOMETRY ON PH STABILITY OF BICARBONATE-BUFFERED MEDIA FOR CELL THERAPY APPLICATIONS

Jean Baptiste BRUCKNER – SARTORIUS › j.bruckner@sartorius.com

Maintaining the chemical stability of bicarbonate-buffered media is a major challenge in cell therapy manufacturing, particularly for CAR-T applications that rely on small single-use containers.

Although the shift from rigid PET bottles to flexible polymer bags has significantly reduced contamination risks, it has also introduced new challenges related to gas permeability and pH control.

This study evaluates how bag design, film type, and tubing material affect pH stability over long-term storage.

Preliminary findings indicate that container geometry and material properties both play a major role in the observed pH evolution over time.

The work emphasizes the importance of understanding CO_2 diffusion behavior to ensure consistent media performance in small-volume formats.



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SESSION SUSTAINABILITY

CHANCES AND LIMITATIONS IN THE USE OF NEW BIOPOLYMERS IN HEALTHCARE PRODUCTS

Julian LOTZ – BIOVOX › julian.lotz@biovox.systems

The transition toward sustainable materials in healthcare requires a precise balance between regulatory compliance, technical performance, and environmental benefit. This presentation examines the opportunities and constraints in substituting conventional fossil-based polymers (ABS, PC, PS, PP, PE) with emerging biobased alternatives. Three representative, commercialized use cases—an oral dosing pipette, selected in vitro diagnostic devices, and, depending on project progress and time available int he presentation, a sterile packaging application or a drug delivery solution—serve to highlight material-specific challenges and benefits. Both biobased drop-in solutions (Bio-PE, Bio-PP) and novel polymers such as PLA and PEF are briefly compared in terms of mechanical properties, processing and sterilization behavior, compliance, environmental footprint including end-of-life scencarios, and cost implications. The findings outline where biopolymers already constitute viable options for medical and pharmaceutical products, and where current limitations still require new polymers or adjusted product designs.



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WEDNESDAY 25 MARCH



SESSION SUSTAINABILITY

KEYNOTE
STRUCTURING A 3D PRINTING PLATFORM IN A HOSPITAL: EXPERIENCE AT BREST UNIVERSITY HOSPITAL

Samuel GUIGO - CHU DE BREST > samuel.guigo@chu-brest.fr

W.Print is the in-house 3D printing platform of Brest University Hospital, integrated within the W.INN innovation center. It enables the design and fabrication of anatomical models, patient-specific assistive devices, and replacement components for hospital use.

Initially established to support surgical planning, the platform has rapidly expanded to encompass a wide range of clinical, technical, and ergonomic applications. Its equipment includes multiple printers using various technologies (FDM, resin, PolyJet).

The advantages are significant:
- Enhanced quality of care through improved surgical preparation and better understanding of pathologies.
- Substantial cost and time reduction (up to fifty times cheaper than outsourcing).
- Increased autonomy and responsiveness in the event of supply shortages.

In 2024, more than 80 projects were completed, generating approximately €120,000 in cost savings. The platform is open to all hospital staff as well as external partners.

Brest University Hospital is now extending W.Print's capabilities toward large-format 3D printing and, in the longer term, the production of customized medical devices.



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SESSION STERILIZATION & IA

YOUNG TALENTS ZOOM

PORTABLE SPRAY DEVICE FOR RAPID DEPOSITION OF ANTIMICROBIAL POLYELECTROLYTE COATINGS

Yijie LI - SPARTHA Medical > jli@sparthamedical.eu

In the 20th century, the misuse and overuse of antibiotics led to an increasing mortality rate globally and a negative financial impact on the healthcare system. The need for antibiotic alternatives is surging. It was discovered that positively charged polypeptides can interact with negatively charged hyaluronic acid through a Layer-by-Layer (LbL) dipping method and form an antimicrobial supramolecular coating in INSERM and Spartha Medical. Polyelectrolyte multilayer made by LbL dip coating method has proved its ability of both antimicrobial and anti-inflammatory properties. The LbL dip coating method consists of depositing the substrate into oppositely charged polyelectrolyte solutions (polyanion and polycation) alternatively, with a buffer raising step in between.

One critical drawback of this dip coating method is that the fabrication time usually takes hours, and the dipping robot is not practical for household use due to its size. Spartha Medical wants to develop a device that can apply the antimicrobial coating rapidly on implantable medical devices and on the wound. Based on this idea, a portable double solution spray system - protect|ION was developed.

For the spray coating method, optical glass slides, medical-grade Titanium (Ti), and medical-grade Silicone were tested as substrates. Poly epsilon L-lysine (εPLL) was used with HA as the primary coating formulation to study the spray method. The PAR30 and HA were also tested as the final spray coating formulation. The influences of the spray distance, the spray layer numbers, and the solution concentration on the coating's antimicrobial ability were studied. To validate the coating fabricating results, in vitro antimicrobial tests, in vitro biocompatibility tests, confocal microscope imaging, primary in vivo antimicrobial tests, and primary in vivo biocompatibility tests were performed. The primary in vivo antimicrobial and biocompatibility experiments were conducted by BIOASTER lab (France). Both gram-positive and gram-negative bacteria were tested in the in vitro antimicrobial test.

The primary antimicrobial results against S. aureus showed that coated glass slides with 3 spray passages presented better antimicrobial ability compared to the coating with only one spray passage. Different coating formulations (with fixed HA concentration of 5 mg/mL and increased PAR30 concentration from 3.5 mg/mL to 10 mg/mL: 3.5P5H, 4.5P5H, 10P5H) and spray coating distances (10 cm and 15 cm) were tested. Medical-grade silicone was selected as substrate. The antimicrobial test results showed that the highest PAR30 concentration (10P5H) presented the best antimicrobial ability against both S. aureus (Gram-positive) and P. aeruginosa (Gram-negative) bacteria. The 10P5H coating formulation was then subjected to an in vitro biocompatibility test on fibroblast cells. After 24 h in contact with the coating, the cell viability remained more than 70%, showing the coating formulation is not toxic. The same results were validated by the microscope images for the cells' morphologies. The 10P5H coating formulation was also tested in an in vivo wound model for antimicrobial ability and biocompatibility. Bioluminescent Methicillin-resistant S. aureus bacteria were tested. The detected bioluminescence signal results showed that the 10P5H coating formulation successfully prevented wound infection after 24 h and 48 h. A The same results were observed as there was about a llog 3 reduction was observed in the spray-coated group on the wound. The host response inflammatory results showed the coating did not induce an inflammatory reaction in the mouse, and the cytokine (IL6) level also showed there was no significant difference between the "spray-coated wounds" and "fresh wounds" group.

It can be concluded that the protect|ION can deliver antimicrobial coating on different substrates, and the 10P5H coating formulation exhibited antimicrobial ability and biocompatibility, which indicated the protect|ION's potential as a medical product to deliver antimicrobial polyelectrolyte coatings on wounds.



MERCREDI 25 MARS
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SESSION STERILIZATION & IA

MEDICAL POLYMER STERILIZATION METHODS

Pierre DEL POZO - SABIC › **pierre.delpozo@sabic.com**
Hans DE BROUWER - SABIC

Sterilization of medical devices requires the materials of construction to withstand the applied conditions. This can be ionizing radiation, steam, heat or gasses. We will review the resistance of typical materials used in healthcare to a variety of techniques, including new data on UVC resistance and vaporized hydrogen peroxide sterilization.



MERCREDI 25 MARS
WEDNESDAY 25 MARCH



SESSION STERILIZATION & IA

GAMMA/E-BEAM TO NEW X-RAYS: HOW TO COMPARE RADIATION STERILIZATION TECHNOLOGIES ON PP, PE AND PET?

Nicolas LUDWIG - Aerial › n.ludwig@aerial-crt.com
Sophie ROUIF - Ionisos Mutual Services › sophie.rouif@ionisos.com
Flavie PETROS - Ionisos Mutual Services
Emma SLIWAK - Ionisos Mutual Services
Belkacem OTAZAGHINE - Institut Mines Telecom
Rodolphe SONNIER - Institut Mines Telecom
Aurelie TAGUET - Institut Mines Telecom
Helene GARAY - Institut Mines Telecom
Florent KUNTZ - Aerial
Yves BAYON - Medtronic

Polyolefins, including Polypropylene (PP) and Polyethylene (PE), and Polyester such as polyethylene terephthalate (PET) are major polymers for the medical industry, for single-use systems (SUS) and for pharmaceutical packaging. Irradiation of PP can induce several physical changes including embrittlement, stiffening, yellowing and decrease of molecular weight [1,2] when irradiation of PE can induce crosslinking and PET often show significant yellowing. All this modification could be a limit to a wider utilisation of irradiation as a sterilization technique. Moreover, irradiation can also induce extractables and change in aging behaviour.

To complement gamma irradiation, X-ray is an today growing as emerging technology and e-beam is more and more used for sterilization applications.

Some commercial medical grades are claimed to be radio-tolerant but their comparative study under radiation including electron beam (EB), gamma irradiation and particularly new X-ray is not investigated through research.

Investigation on several grades of each polymer class with the 3 mentioned radiation technologies has been conducted in the frame of the Coordinated Research Project (CRP) n°F23035, led by IAEA. Several laboratory techniques were used to characterize physico-chemical, mechanical and thermomechanical properties of the material, at molecular and macromolecular levels.

Materials' behaviors were established with the dose and in correlation with the dose rate, as it was maintained at a standard processing level typical to each irradiation technology. Results will be discussed on several analysis techniques: ESR, rheology, tensile tests, colorimetry and chemical analyses of extractibles.



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SESSION STERILIZATION & IA

MODELING THE PERFORMANCE OF POLYMERS UNDER X-RAY AND GAMMA STERILIZATION VIA MACHINE LEARNING

Hakim BOUT – SARTORIUS › hakim.bout@sartorius.com

This project tackles the challenge of predicting polymer performance during X-ray and gamma sterilization by utilizing Sartorius datasets to develop machine learning (ML) models. These models establish equivalence factors between the two sterilization methods, facilitate predictions from incomplete datasets, and incorporate uncertainty limits to aid decision-making. Through active learning, the models suggest experiments that can reduce uncertainty, thereby minimizing the need for extensive testing. Users can continuously upload new experimental data, allowing the models to evolve and improve over time. Furthermore, the trained model serves as a foundation for developing models and making predictions for new polymer families through transfer learning.



MERCREDI 25 MARS
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Innovative bioabsorbable filaments for 3D printing: use cases in tissue engineering applications

Julien PAYEN- LATTICE MEDICAL > **julien.payen@lattice-medical.com**



MERCREDI 25 MARS
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SESSION STERILIZATION & IA

INTRODUCTION TO THE SESSION INNOVATIVE MATERIALS: MEDICAL PLASTICS - A TECHNICAL REVIEW

Florian COTIN – CERTECH › florian.cotin@certech.be

Plastics used in healthcare need to comply with various technical challenges like general performance, biocompatibility, chemical and temperature resistance as well as frequent sterilization cycles. Common uses include medical devices like syringes, implants, prosthetics, diagnostic tools, and pharmaceutical packaging. The presentation will discuss current materials, developments, and trends.

PROGRAMME 26 MARCH 2026

8:30 **WELCOME COFFEE**

SESSION INNOVATIVE MATERIALS

Chairpersons : Sébastien CHARLON – IMT Nord Europe & Clara LECLAIRE – TECHTERA

9:00 **Polymers for health and biomaterials**
Vincent DARCOS, *Xavier GARRIC, Benjamin NOTTELET, Coline PINESE, Hélène VAN DEN BERGHE* - IBMM

9:25 **Innovative biopolymer membrane for periodontal ligament regeneration**
Marine ROUSSET, *Xavier SOLIMANDO* **-** CANOE
Jean-Sébastien BAUMANN, *Céline FALENTIN DAUDRE* - CB3S

9:50 **Innovative Technology for Polymer Impregnation in Medical Devices**
Nancy HUMMEL - FIBROLINE

10:15 **COFFEE BREAK**

SESSION PFAS FREE

Chairpersons : Nicolas LONGHITANO – POLYMERIS & Lucie DELAUNAY – SARTORIUS

11:00 **Link between PFAS as an emerging E&L compound and the regulatory framework on the suitability of a polymer in healthcare**
Frank DE SMEDT – Dy.Fr.Nd.

11:25 **Replacing PTFE with UHMWPE: A High-Performance, PFAS-Free Approach to Medical Component Design**
Manuel SCHERER, Cécile BALLOFFET - CELANESE

11:50 **Surface Functionalization as an Alternative to PFAS**
Pauline SPARD, Matthieu BESSE - CLAYENS

12:15 **CONCLUSION**

12:20 **LUNCH**

13:15 **END OF THE CONGRESS**

13:20 to 15h30 **VISIT OF POLYPLUS –SARTORIUS – On** registration only (validation by the host company)





Polyplus-Sartorius is a France-based company specializing in upstream technologies for advanced biologics, including cell and gene therapies.

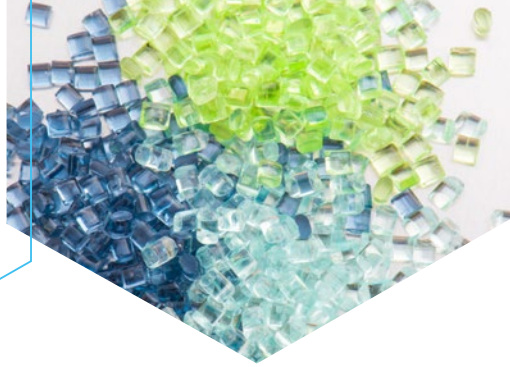
Polyplus develops and manufactures transfection reagents and plasmid DNA used to introduce genetic material into cells—an essential step in the production of viral vectors for innovative therapies. Its activities span from research and process development to GMP manufacturing, within highly controlled and regulated environments.

This visit offers participants the opportunity to step into a cutting-edge biomanufacturing setting and discover how advanced therapies are developed and produced. It will provide insight into process development laboratories and production areas, illustrating the complexity and precision required to bring innovative healthcare solutions. Participants will observe single-use equipment used in development and manufacturing within highly controlled environments.

- **13:20** – Departure from Institut Charles Sadron by shuttle or personal vehicle
- Visit to Polyplus
- **15:30** – End of the visit
- By shuttle - Return to **Strasbourg SNCF railway station -** Estimated arrival time: **16:15**



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SESSION INNOVATIVE MATERIALS

POLYMERS FOR HEALTH AND BIOMATERIALS

Vincent DARCOS – IBMM › vincent.darcos@umontpellier.fr
Xavier GARRIC, Benjamin NOTTELET, Coline PINESE, Hélène VAN DEN BERGHE – IBMM

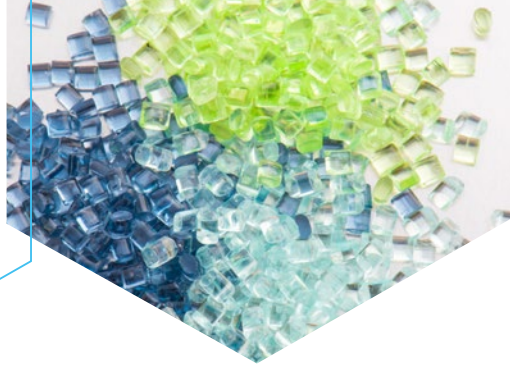
Polymer-based biomaterials are playing an increasingly important role in modern healthcare, providing versatile platforms for diagnostics, therapy, and regenerative medicine. Biocompatibility represents a significant challenge for medical device manufacturers and smart drug delivery technologies, from polymer development to market authorization.

The department "Polymer for Health and Biomaterials" (PHBM) is a multidisciplinary research group dedicated to polymers related to biomedical applications. Our activities range from polymer synthesis to in vivo studies, including polymer characterization and shaping. PHBM also benefits from the SynBio3 platform, recognized for its expertise in polymer synthesis and characterization. In addition, the majority of PHBM projects are based on a clinical need. More specifically, our research activities focus on the design and optimization of sustained- and controlled-release drug delivery systems, the development of innovative medical devices or scaffolds for tissue engineering, and the implementation of advanced strategies for the synthesis of functional polymeric biomaterials.

This presentation will highlight a series of projects spanning from fundamental research to highly applied work, including success stories such as the creation of the start-up Womed. It will also demonstrate how the activities of the SynBio3 platform have provided significant added value to the research projects carried out within the PHBM group.



JEUDI 26 MARS
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SESSION INNOVATIVE MATERIALS

INNOVATIVE BIOPOLYMER MEMBRANE FOR PERIODONTAL LIGAMENT REGENERATION

Marine ROUSSET - CANOE › **rousset@plateforme-canoe.com**
Xavier SOLIMANDO - CANOE
Céline FALENTIN DAUDRE - CB3S › **falentin-daudre@univ-paris13.fr**
Jean-Sébastien BAUMANN - CB3S

This study presents a collaborative effort between CANOE, a R&T center specializing in advanced material and polymer processing, and CB3S, a research laboratory dedicated to biomechanics and biomaterials for health.

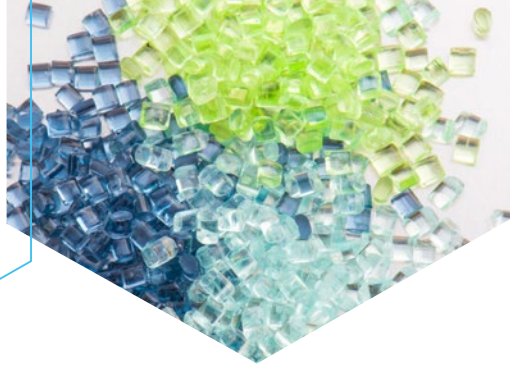
The objective was to design and fabricate a bilayer scaffold intended for ligament regeneration, combining complementary structural and functional properties.

The first layer, developed by CANOE was produced using solvent-based fiber formation (wet spinning) followed by wetlaid processing to obtain a nonwoven fibrous architecture with controlled porosity and mechanical integrity. This configuration aims to provide a stable support for cellular colonization and tissue integration. The second layer, developed by CB3S, was fabricated via electrospinning, yielding a highly organized nanofibrous structure that mimics the extracellular matrix, thereby enhancing cell adhesion and proliferation.

The bilayer design is expected to deliver synergistic benefits: mechanical reinforcement from the fibrous support and biological functionality from the nanostructured surface. Preliminary evaluations of interfacial adhesion and biological performance are ongoing to validate the scaffold's potential for ligament repair applications.



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SESSION INNOVATIVE MATERIALS

INNOVATIVE TECHNOLOGY FOR POLYMER IMPREGNATION IN MEDICAL DEVICES

Nancy HUMMEL – FIBROLINE > nhummel@fibroline.com

Fibroline is a global leader of sustainable dry powder impregnation technologies supplying turnkey solution for medical field and supporting its partners for the development of revolutionary and ecofriendly new products.

The Fibroline technologies are based on the application of an alternating electric field, allowing a controlled impregnation of the particles into any porous media like foams, textiles, nonwovens and yarns. Any type of functional powder can be impregnated without using solvents or water.

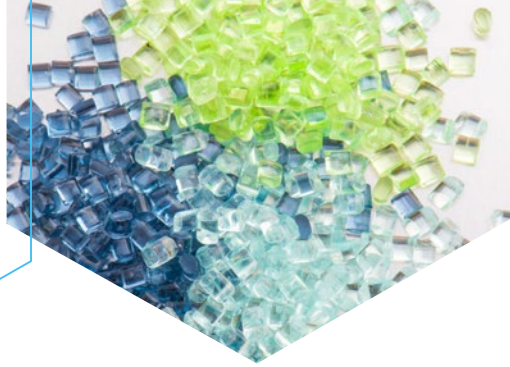
The powders can be biopolymer as cellulose, starch, chitin, collagen or synthetic polymer as polyethylene, polycaprolactone, polylactic acid, polyhydroxyalkanoate, polyethylene glycol.

The porous structures can be composed of synthetic polymers. Some examples are polyurethane foam, polyethylene knitted fabric, polyester textile or viscose nonwoven.

Fibroline can present an example of medical product manufactured by using the dry impregnation technology: Ethizia™ hemostatic sealing patch. This is a gelatin-based carrier impregnated with activated POx polymer technology. This product is indicated for use during surgery on internal organs as an adjunct to hemostasis for minimal, mild, moderate bleeding sites, when control of bleeding by standard surgical techniques is ineffective or impractical.



JEUDI 26 MARS
THURSDAY 26 MARCH



SESSION INNOVATIVE MATERIALS

LINK BETWEEN PFAS AS AN EMERGING E&L COMPOUND AND THE REGULATORY FRAMEWORK ON THE SUITABILITY OF A POLYMER IN HEALTHCARE

Frank DE SMEDT – Dy.Fr.Nd

Polymers used to construct pharmaceutical containers/delivery systems/packaging or are a material of construction for medical devices should comply or be evaluated to so-called Pharmacopeia monographs (compendial) and exhibit an acceptable Extractables profile. This evaluation if part of the (toxicological) safety assessment of the final device or packaging.

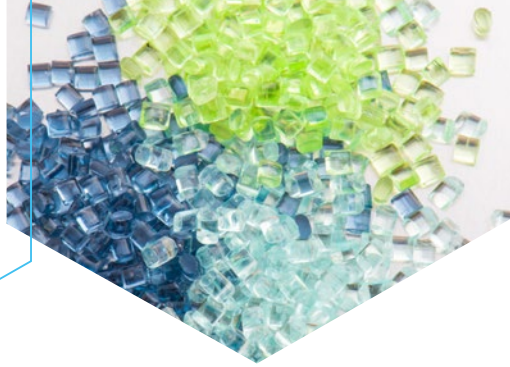
Compendial Testing on plastic materials being a so-called material of construction assures the starting material is suited for intended use and complies with a basic quality level, batch after batch.

This presentation will focus on:

- Regulatory framework of compendial testing for plastic materials for medical and pharma applications (EU and US market).
- Compendial as a quality control measures in the production of plastics.
- Extractables testing to provide data for the toxicological assessment.
- Some examples of new emerging chemical species in the safety assessment and the associated analytical challenges, with a focus on PFAS.



JEUDI 26 MARS
THURSDAY 26 MARCH



SESSION PFAS FREE

REPLACING PTFE WITH UHMWPE: A HIGH-PERFORMANCE, PFAS-FREE APPROACH TO MEDICAL COMPONENT DESIGN

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As regulatory scrutiny intensifies around per- and polyfluoroalkyl substances (PFAS), particularly in the EU, the medical device industry is actively seeking sustainable alternatives to fluoropolymers like PTFE.

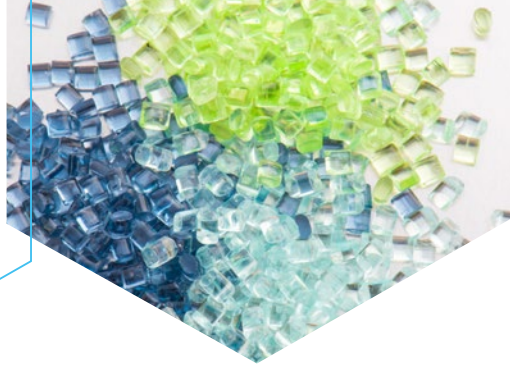
UHMWPE (ultra-high molecular weight polyethylene) from Celanese presents a compelling PFAS-free substitute, offering comparable tribological and chemical resistance properties while significantly outperforming PTFE in abrasion resistance and impact strength.

With proven applications in medical components such as artificial joints, permanent implantable sutures, porous filters used as membranes, UHMW-PE supports diverse processing methods including compression molding and different extrusion techniques and limited injection moldability.

Its physiologically safe profile (FDA compliant), low friction, and reduced carbon footprint make it a strong candidate for next-generation medical device designs that prioritize environmental responsibility without compromising performance.



JEUDI 26 MARS
THURSDAY 26 MARCH



SESSION PFAS FREE

SURFACE FUNCTIONALIZATION AS AN ALTERNATIVE TO PFAS

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The surface functionalization technology developed by Clayens offers an innovative approach to modify the behavior of plastic surfaces without the use of chemical coatings or additives.

This process relies on the direct texturing of injection mold cavities with micro- and nanometric patterns, which are precisely replicated on each injected part. By tailoring the surface topography at the mold level, it becomes possible to impart specific functional properties (such as hydrophobicity, anti-friction performance, or antibacterial effects) directly into the plastic component itself.

Beyond its technical performance, this technology represents both an ecological and economic alternative. It enables the elimination of fluorinated materials, such as polytetrafluoroethylene (PTFE), and other lubricants traditionally used to improve the sliding properties of technical plastics. By replacing chemical treatments with engineered surface morphology, Clayens provides a sustainable, cost-effective, and scalable solution aligned with current environmental and regulatory challenges surrounding PFAS reduction.