We have placed particular emphasis on the use of environmentally-friendly materials in the production of this brochure.

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(BIO-)HYBRID COMPOSITE MATERIALS

The employees at the Application Center HOFZET conduct research in the fields of hybrid fiber composite materials with thermoplastic and thermoset matrix, additive manufacturing, the production and application of technical textiles and the recycling of polymeric composites. We concentrate in particular on the higher-value usage of natural fibers and derivatives for technical applications – from fiber extraction through to product and process development. Our goal, in collaboration with our industry partners, is to find new applications for hybrid (bio) fiber composites and to develop future-oriented products and technologies.

Research focuses

Fiber analysis and modification
Modification of fiber and fabric surfaces as well as comprehensive analysis, e.g. by means of SEM, 3D microscope, computer tomography and FibreShape. Determination of the size distribution of fibers and particles up to 5 μm and measurement of the surface energies of solids, fibers, granulates and liquids.

Recycling of bioplastics and fiber-composite materials
In addition to the material recycling, the feedstock recycling of composites and bioplastics is also being investigated. Chemical, thermal (e.g. pyrolysis) and mechanical processes for End-of-Life/New-Life scenarios as well as further application possibilities for recycled materials are hereby being studied.

Functionalized technical textiles
Production of multi-layer, spacer and hybrid textiles by means of weaving technology. Realization of differing reinforcing regions within the fabric structure. Creation of textile semi-finished products from reinforcing and matrix components for further processing, for example to form (bio-based) organic sheets.

Hybrid (bio-)fiber-composite materials
Conceptual design, manufacture and processing of sustainable, continuous fiber-reinforced thermoplastics (organic sheets) and thermosets as well as short fiber-reinforced composite materials. Combination of different procedures such as injection molding and fiber spraying. Focus is placed upon lightweight construction aspects as well as functional integration tailored to the specific requirements of the component.

Injection molding processing of short fiber-reinforced compounds
Processing of non-reinforced and reinforced thermoplastic compounds by means of e.g. injection molding up to the finished component. The application-oriented material development takes into account the dependencies between the material composition and the processing performance.

Material and damage analysis by means of computer tomography
By means of computer tomography, materials and components can be represented three-dimensionally, swiftly and non-destructively. Our investigation service includes, amongst others, the digitalization and measurement of components, defect detection (e.g. cracks, pores...), fiber analysis and in situ examinations.

Services

- Consultation on technical issues regarding the production and use of sustainable materials
- Process development and optimization for composite materials
- Problem-oriented material selection, development and optimization
- Processing of wood, natural and synthetic reinforcing fibers
- Application of conventional and biogenic matrices (thermoplastics and thermosets)
- Multi-component injection molding and extrusion-technical compounding
- Material and process developments for additive manufacture
- Production of multi-layer, spacer and hybrid textiles
- Non-destructive and destructive material characterization and damage analysis
- Recycling (End-of-Life and New-Life scenarios)

Technical equipment

- Extrusion technology center with throughput of 2-200 kg/h
- Injection molding technology center with machines of 50 to 320 tonnes clamping force
- Production of thermosetting composite materials
- Organic sheet production
- Double-rapier weaving machine with Jacquard technology for the manufacture of single and multi-layer technical textiles
- Fiber analytics and characterization
- Computer tomography of test samples up to 500 mm diameter
- In situ CT (e.g. 4-point bending test)
- Rheology (MFI, flow curves, injection molding test tools)
- Morphology (incl. SEM)
- Elemental analysis (EDX)
- Mechanical testing laboratory (incl. tensile, pressure and bending tests)
- Temperature and climate testing
- Fiber spraying facility

Together with the Hannover University of Applied Sciences and Arts, we offer you a wide range of manufacturing processes and investigation methods in the areas of plastics technology and bio-composites. HOFZET partners are predominantly companies from the automotive, construction, furniture and environmental industries. Should you have any questions regarding fiber technology, please do not hesitate to contact us.

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