

composites



Textile and fibre reinforced
composite materials

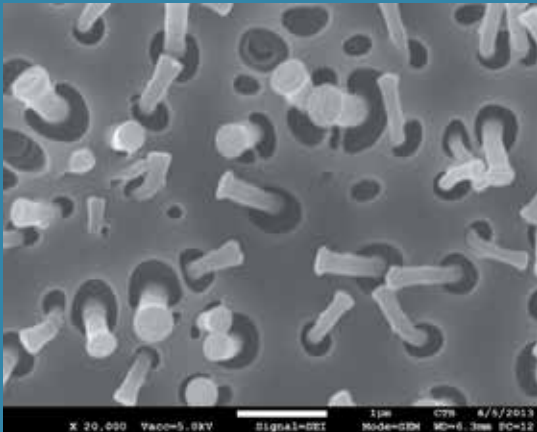
Composite materials are made from two or more constituents in separate phases. Most composites are fibre-reinforced: the fibres are embedded in a (polymer) matrix and provide high mechanical properties. The matrix connects and protects the fibres from the environment.

The fibre reinforcement may consist of individual fibres or of a textile material such as a woven, knitted or nonwoven fabric or a braid. The fibres in the matrix may be oriented in one or more directions, affecting as such the mechanical performance of the final composite.

RESEARCH & DEVELOPMENT



3D Interlock braids



Microfibrils cross section - SEM image



Prototype bio-based composite car seat

Textile preforms

- hybrid textile materials containing both reinforcement fibres (carbon, glass, ...) and thermoplastic matrix fibres (PP, PLA, etc), are made by di-ply extrusion, intermingling, braiding, ...
- 3D interlock braids, knits and non-crimp fabrics

Fully thermoplastic composites

- self-reinforced polymer composites consist of a polymer matrix reinforced by high tenacity thermoplastic fibres. The fibre reinforcement and matrix are of the same polymer class. Centexbel's research mainly focuses on self-reinforced PP and PLA composites.
- microfibrillar reinforced composites: by processing two immiscible thermoplastic polymers, Centexbel succeeded in producing composites that are reinforced by thermoplastic microfibrils.

Natural fibre-based composites

- bio-based thermoplastic composites: e.g. flax/PLA, hemp/PP
- bio-based thermoset composites: e.g. flax/furan

Prepreg development

- UV-curable thermoset composites
- application of hotmelt process
- bio-based prepreps

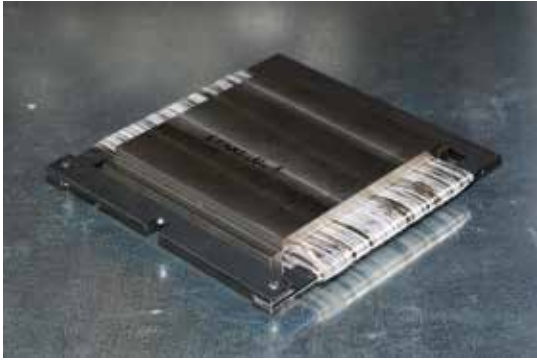
Functionalisation

- fibres, textiles and hybrid structures: FR, self-healing and hydrophobic properties, UV-stabilisation, conductivity, etc.

Recycling

- eco-design and product development in view of end-of-life and recycling
- analysis and re-use of original additives
- recycled content

PROTOTYPING



Composite sample preparation



3D Interlock braiding machine

Development, functionalisation and processing of textile fibres, textile preforms, prepregs & composites:

- compounding (e.g. matrix modification)
- melt extrusion of thermoplastic (bi-component) fibres/tapes & profiles/film
- knitting & 3D interlock braiding
- textile coating & impregnation lines
- composite press & double belt laminator
- injection moulding of ISO 1A and ASTM D5 test samples

Centexbel/VKC's highly skilled experts, well-equipped technological platforms and broad international cross-sector network are at your service for prototyping and small-scale industrial trial runs.

TESTING



Bending test

Assessment of textile and composite properties:

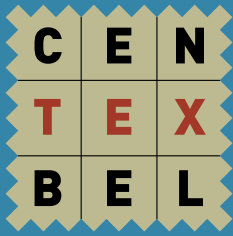
- characterisation of thermoplastic matrix: DSC, melt rheology, ...
- fibre/matrix adhesion
- mechanical properties: tensile, compression, flexural strength, creep, impact, ...
- thermo-mechanical properties: DMA, HDT, Vicat, ...
- burning behaviour
- microscopic analyses
- emission of volatile organic compounds (VOC)
- UV-stability

SERVICES

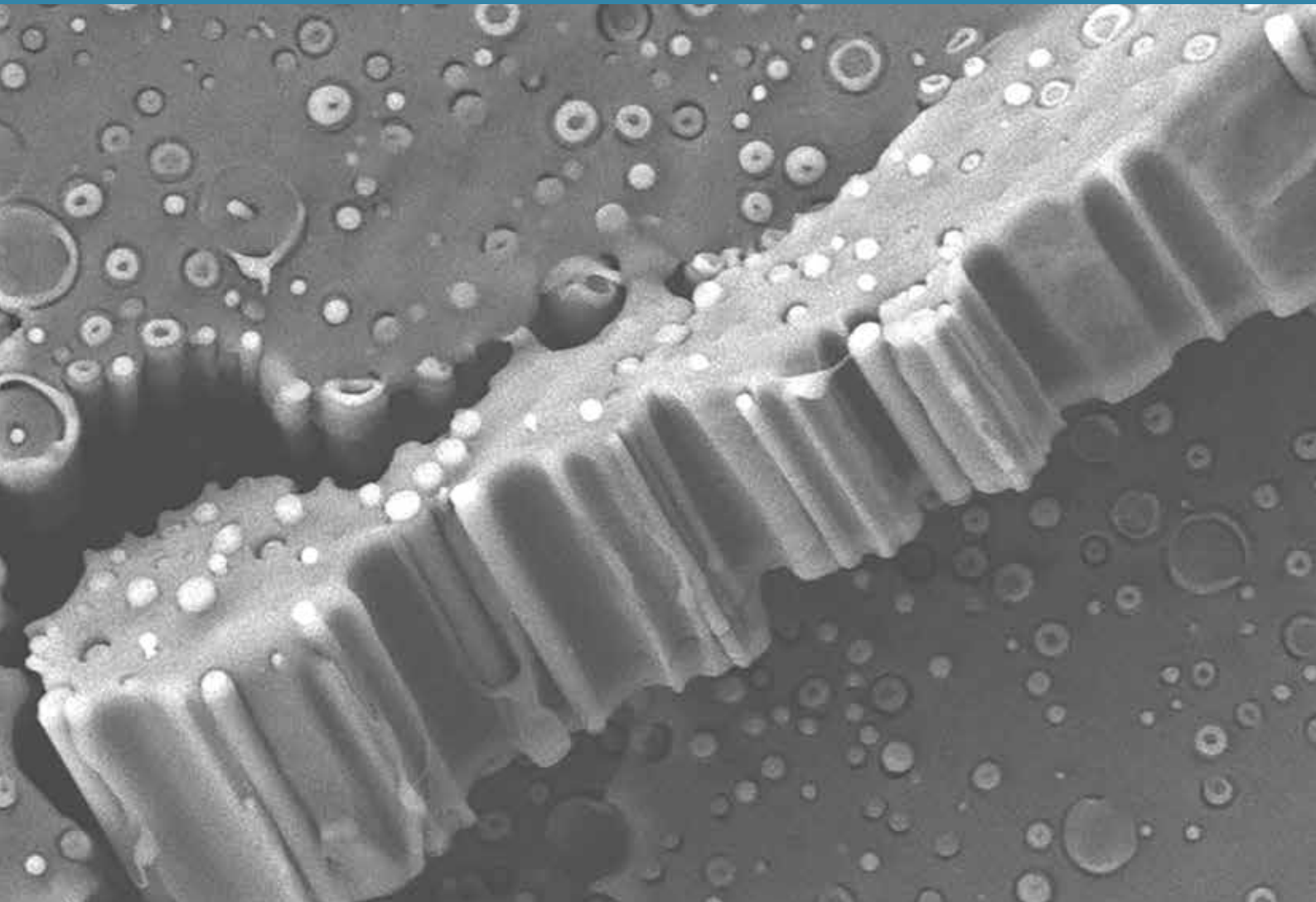


Composite press

- initiation and support of private research projects on composites
- advice on intellectual property rights (IPR) and patent search
- technological and innovation advice
- certification & standardisation
- REACH conformity
- LCA analysis
- training & information sessions



Centexbel & VKC-Centexbel support the textile and plastic processing supply chains in the development and introduction of novel materials, innovative products and technological processes.



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