Recycling carbon fibres: Hybrid nonwovens for industrial lightweight construction

About this project

VliesComp

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Markets:

Material: Aramid fibres, Carbon fibres, Natural fibres, Thermoset plastics, Thermoplastics, Nonwovens, mats, Aramid fibre composites, Carbon-fiber reinforced plastics (CFRP), Natural fibre reinforced plastics (NFRP)

This project is funded by the Technology Transfer Programme Leichtbau (TTP LB) of the Federal Ministry of Economics and Energy.

Technology Transfer Program Leichtbau

Context

In the traditional production of technical textiles, a lot of waste is generated from cutting remnants. At the same time, the demands on the industry to develop sustainable and resource-saving alternatives are increasing. Conventional reinforcing materials such as continuous fibre textiles are reaching their limits here.

Hybrid fibre nonwovens, which combine recycled materials and thermoplastic components, offer a solution. They not only enable the reuse of waste, but also reduce the environmental impact. The VliesComp project is researching how these materials can be processed into lightweight components for machine tool construction, e-machines or medical technology.

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Purpose

The aim of the project team is to integrate recycled fibres from production waste into high-performance materials for lightweight construction and thus make the recycled fibres ecologically and economically usable. The focus is on the development of hybrid nonwovens consisting of thermoplastic and recycled reinforcing fibres.

These materials should not only conserve resources, but also be cost-efficient and versatile. The researchers are not aiming to achieve the maximum possible mechanical strength, but to develop customised materials for specific industrial applications.

Procedure

The project team first defines the requirements for materials and processes. The researchers then develop new technologies for hybrid nonwovens by combining recycled reinforcing fibres with thermoplastic components. This results in materials that have application potential in numerous fields. With the help of modern process control and digital twins, the team optimises the production steps and tests the materials in real components.

The first applications have already been successful: the researchers can manufacture components such as damping elements or housing covers entirely from recycled fibres. In doing so, they are significantly improving the carbon footprint of the components - by up to 70 per cent in some manufacturing processes. And this while maintaining the same technical performance.

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Funding duration:

Funding sign:	03LB3005	**Funding amount:**	EUR 1.1 million

Further websites foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB3005A - VliesComp in the federal funding catalogue

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Project coordination

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English (EN){{ Projektpartner }}

Lightweighting classification

	Realisation
Offer	
Products Parts and components, Semi-finished parts, Materials, Tools and moulds	✓
Services & consulting	

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Lightweighting classification

	Realisation
Field of technology	
Design & layout Hybrid structures, Lightweight material construction	✓
Functional integration	
Measuring and testing technology Component and part analysis, Environmental simulation, Materials analysis	✓
Modelling and simulation Loads & stress, Structural mechanics, Materials	✓
Plant construction & automation Plant construction	✓
Recycling technologies Recycling	✓
Manufacturing process	
Additive manufacturing	
Coating (surface engineering)	
Fibre composite technology Resin infusion process, Pre-preg processing	✓
Forming Thermal converting	✓
Joining	
Material property alteration	
Primary forming	
Processing and separating	
Textile technology Nonwoven & mats production	✓

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Lightweighting classification

	Realisation
Material	
Biogenic materials	
Cellular materials (foam materials)	
Composites Aramid fibre composites, Carbon-fiber reinforced plastics (CFRP), Natural fibre reinforced plastics (NFRP)	✓
Fibres Aramid fibres, Carbon fibres, Natural fibres	✓
Functional materials	
Metals	
Plastics Thermoset plastics, Thermoplastics	✓
Structural ceramics	
(Technical) textiles Nonwovens, mats	✓