Produce aerogels cost-effectively: Innovative system for lightweight concrete and plaster

About this project

Aerolight

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Markets:

Material: Others (Inorganic aerogels)

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About this project

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 order to drive forward the energy transition and achieve the EU's climate protection targets, energy and resources must be saved. 75 per cent of all buildings in the EU are not energy-efficient by today's standards. At the same time, there is currently a lack of flexible, functional and cost-effective materials for thermal insulation in the construction sector.

Aerogels are porous solids in which the majority of the volume consists of pores. The fine structure of the aerogel firmly traps air molecules, resulting in a unique insulating effect. The nanopores in the aerogel restrict the heat-conducting air molecules so much in their freedom of movement that no energy is passed on to other air molecules. This turns the aerogel into a high-performance insulator with very low thermal conductivity, which leads to greater energy efficiency during the utilisation phase of the building or product fitted with it. The mineral insulating materials do not require any petroleum-based raw materials.

Purpose

The project team is developing an innovative and sustainable system for insulating plaster and lightweight concrete that creates completely new possibilities. The aim is to develop a cost-effective manufacturing process for aerogels and new formulations. Aerogels are to be utilised in various applications in the field of thermal insulation systems, lightweight concrete and sandwich elements for façades and roof elements. The researchers are further developing the existing pilot plant for aerogels in order to transfer the process to an industrial scale, taking economic aspects into account, and thus make it economically competitive in the mass market for thermal insulation.

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Procedure

The researchers are investigating the entire value chain, from material selection and production to processes and system customisation. The centrepiece of the work is the expansion of the existing plant to include additional pump technology. In addition, separators are planned to enable the recovery of the individual fluids, in particular the solvent, in order to make the process more economical.

The result is a new type of production process for aerogels that combines various production steps. Manufacturing costs are reduced by half. Production is reduced from more than ten hours to just four hours and does not require any environmentally hazardous chemicals. The process has been successfully trialled on a small scale and the next step is to transfer it to an industrial scale.

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About this project

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Project coordination

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English (EN){{ Projektpartner }}

AEROLIGHT

Lightweighting classification

	Realisation
Offer	
Products Materials	✓
Services & consulting Testing and trials	✓

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Lightweighting classification

	Realisation
Field of technology	
Design & layout Lightweight material construction	✓
Functional integration Material functionalisation	✓
Measuring and testing technology	
Modelling and simulation	
Plant construction & automation Plant construction	✓
Recycling technologies	
Manufacturing process	
Additive manufacturing	
Coating (surface engineering)	
Fibre composite technology	
Forming	
Joining	
Material property alteration	
Primary forming	
Processing and separating	
Textile technology	

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Lightweighting classification

	Realisation
Material	
Biogenic materials	
Cellular materials (foam materials) Others (Inorganic aerogels)	✓
Composites	
Fibres	
Functional materials	
Metals	
Plastics	
Structural ceramics	
(Technical) textiles	