Reducing emissions in car production: with digital twins and recycled aluminum

About this project

S3-ALU

Reducing emissions in car production: with digital twins and recycled aluminum

Markets:

Material: Aluminium

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

Technology Transfer Program Leichtbau

Reducing emissions in car production: with digital twins and recycled aluminum

About this project

Context

The automotive industry is facing the challenge of making its production more climate-friendly. Aluminum in particular contributes significantly to the CO# footprint of cars due to its energy-intensive manufacturing process. In order to reduce emissions, recycled aluminum - so-called secondary aluminum - will be increasingly used in the future. Compared to primary aluminum - i.e. aluminum produced directly from the raw material for the first time - significantly less energy is required in the production of secondary aluminum. The researchers in the S3-ALU project want to exploit this savings potential.

Purpose

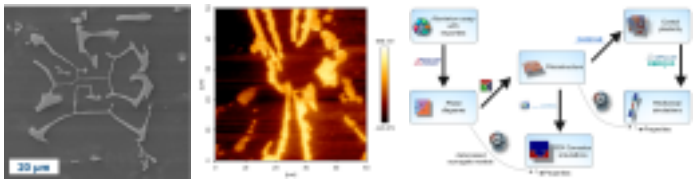
The aim of the project participants is to replace primary aluminum in automotive production with secondary aluminum without losing the advantageous properties of the material. They want to use simulations to evaluate the quality and sustainability of the recycled materials. The use of secondary aluminum is intended to significantly reduce the CO# footprint per vehicle and promote sustainable lightweight construction.

Procedure

The researchers are developing and using a digital twin to model different compositions of recycled aluminum. The virtual representation depicts the properties of the recycled aluminum and evaluates the suitability of the available aluminum scrap of different qualities for material production. Thanks to the digital twin, the project partners can test different material variants in a time and resource-saving manner without having to carry out numerous physical experiments. This allows them to determine how high the proportion of recycled aluminum can be without compromising the material quality. In addition, the components can also be evaluated in terms of their carbon footprint.

Reducing emissions in car production: with digital twins and recycled aluminum

About this project



Funding duration:

Funding sign:	03LB3091	**Funding amount:**	EUR 1.9 million

Final report

Further websites

foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB3091A - S3-Alu in the federal funding catalog

Reducing emissions in car production: with digital twins and recycled aluminum

Project coordination

Contact:

Mr Dr. Daniel Höche

+49 04152 87-1914

daniel.hoeche@hereon.de

Organisation:

Helmholtz Centre hereon GmbH

Max-Planck-Str. 1
21502 Geesthacht
Schleswig-Holstein
Germany

hereon.de

English (EN){{ Projektpartner }}

Leichtmetallgießerei Bad Langensalza GmbH

Reducing emissions in car production: with digital twins and recycled aluminum

Lightweighting classification

	Realisation
Offer	
Products Parts and components, Semi-finished parts	✓
Services & consulting	
Field of technology	
Design & layout	
Functional integration Sensor technology	✓
Measuring and testing technology Materials analysis	✓
Modelling and simulation Optimisation, Processes, Materials, Others (Digital twin)	✓
Plant construction & automation	
Recycling technologies Recycling	✓
Manufacturing process	
Additive manufacturing	
Coating (surface engineering)	
Fibre composite technology	
Forming	
Joining	
Material property alteration	
Primary forming Casting	✓
Processing and separating	
Textile technology	

Reducing emissions in car production: with digital twins and recycled aluminum

Lightweighting classification

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