Partners

SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

LASER ZENTRUM HANNOVER e.V.

TECHNISCHE UNIVERSITÄT DRESDEN

VUB

SVÚM

Associations

clutex
cluster technical textiles

DVS VERBAND

Forschungskuratorium textil

Funding Agencies

AIF German Federation of Industrial Research Associations „Otto von Guericke" e.V. (AiF) / Federal Ministry for Economic Affairs and Energy (BMWi)

MPO – Czech Ministry of Industry and Trade

Coordinator

Forschungskuratorium Textil e.V.
Reinhardtstr. 12-14
10117 Berlin
Phone: +49 30 72 62 20-0
Fax: +49 30 72 62 20-49
Internet: www.textilforschung.de

Contact

Sächsisches Textilforschungsinstitut e.V.
Annaberger Straße 240
09125 Chemnitz
Email: stfi@stfi.de
Internet: www.stfi.de

Managing Director:
Dipl.-Ing.-Ök. Andreas Berthel

Project Manager:
Dipl.-Chem. Marén Gültner
Phone: +49 371 5274-249
Email: maren.gueltner@stfi.de

Internet: www.stfi.de/metexcom

MeTex Com 2

Development of metal-textile composites with improved adhesion behaviour by structuring of metal surfaces with an anodic TIG arc process or a CW laser process

19th Cornet Call

Project Start Date CZ: 01.01.2016
Project Start Date Ger: 01.04.2016
Project Duration: 24 months

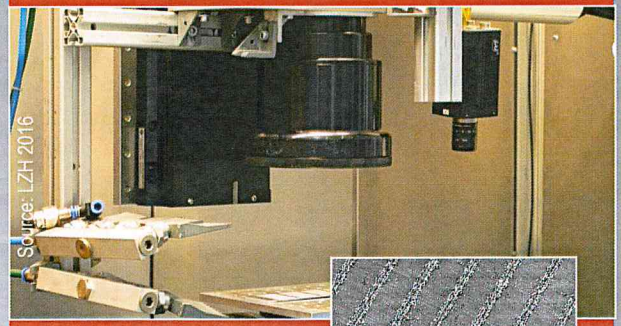
cornet

Goal

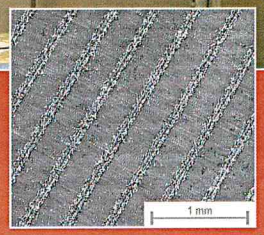
The goal of project MeTexCom2 is to develop high performance metal-textile composite structures using a joining technique that can be performed without additional adhesives. In this way the gluing step during the production of such composites can be skipped and the problematic emission of organic solvents can be avoided. The metal-textile composites are expected to show an improved adhesion, acoustic and armouring behaviour as well as good thermal insulating properties. Target applications are seen in the automotive and construction sector.

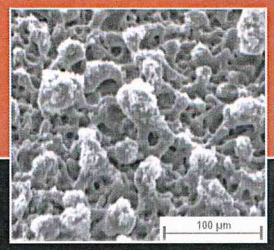
Background

Light weight structures often show a bad acoustic behaviour caused by their thin construction and lack of mass for damping. The combination of different materials, e.g. metal sheets and textile components, seems to be a promising approach to improve the sound absorption in order to enhance the acoustic properties. However, there is one main problem: the inherent bad adhesion between metal and polymer, which requires a strong gluing material. To overcome this disadvantage the TIG plasma treatment and the CW laser texturing provide new innovative techniques to improve the adhesion behaviour. With their help cavern-like micro or nanostructures can be generated on the metal surface. During the joining process the molten thermoplastic fibres of the fabrics used can infiltrate into the microstructures and permit a high-performance layered composite by improved adhesion and form fit.

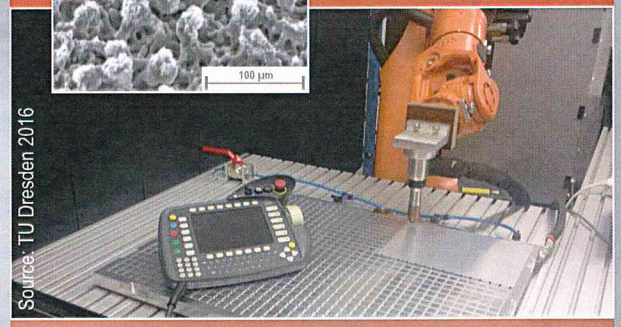


CW laser treatment





TIG plasma treatment



Methods

To reach the required properties of the final products the following methods will be used:

- Tungsten inert gas (TIG) arc and continuous wave (CW) laser texturing of metal surfaces,
- Preparation of acoustic and thermal insulating nonwovens,
- Preparation of textile composites based on armouring textiles with polymeric interface,
- Joining by heat pressing and lamination methods.

Innovation

The innovation is based on two key technologies. One lies in the texturing of the metal surfaces using a TIG arc or CW laser technique to obtain cavern-like structures in nano and micron scale. The other one is the development of textile structures with integrated thermoplastic fibres or foils that can infiltrate in these surface structures during the joining where pressure and heat are applied. Another novelty of MeTexCom2 is the usage of inorganic reinforcing fibres in the woven textiles for armouring and reinforcing properties. Furthermore, an improvement of the adhesion behaviour and an optimization of the texturing method, textile structures, and the joining methodology are aimed at achieving industry orientated results.