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Development of Metal-Textile- Composites with Improved Adhesion Behaviour

13th Cornet Call

Project Start Date: 01.11.2012
Project Duration: 24 months



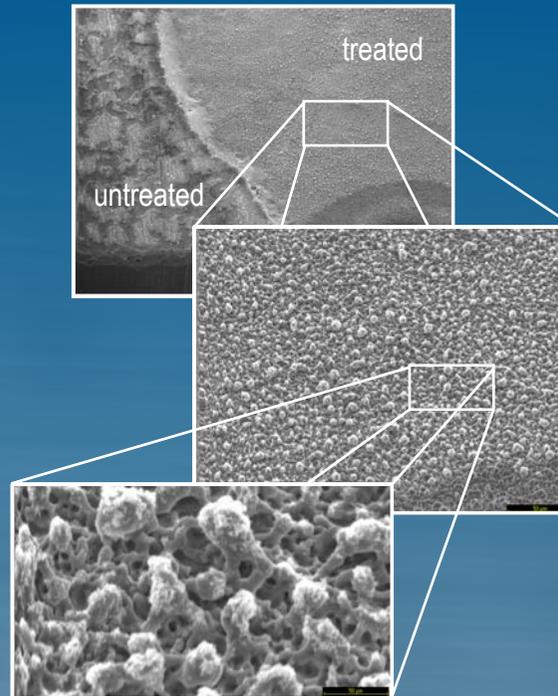
Goal

The main objective of the project is to develop novel polymer metal composites with superior adhesion behaviour between the metal and the textile surface leading to extreme light weight structures with interesting acoustic features and insulating behaviour.

Background

Light weight structures often show a bad acoustic behaviour caused by their thin construction and lack of mass for damping. Therefore several ideas were tested to improve the sound absorption to increase the acoustic feature. The combination of different materials seems to be especially promising. There is only the bottle neck of inherent bad adhesion between metal and polymer material, which requires strong gluing material. For this the plasma treatment provides a new innovative technique to improve the adhesion behaviour.

Source: DC04 Z100 TU Dresden 12/2012



Micro structure of metal sheet surfaces after treatment with an anodic poled TIG process

Flat bed laminating plant Thermofix®



Innovation

The application of an atmospheric plasma treatment to create a micro/nano-structure of the metal surface improves the adhesion behaviour drastically. So a bond between different materials will become possible without any adhesive. The development of multi-function Metal-Textile-Composite with acoustic, thermal and structural functions have the potential for application in the field of automotive as well as construction industry.

Methodology

For the solution of the problem, three different basic textile fabric constructions (nonwoven, woven and knitted/warp knitted structure) will be investigated in combination with three different sheet metal structures to create completely new functional multi-material designs, so called hybrid structures, which fulfil the requirements of an interesting acoustic and insulating behaviour.

