

## SILICONE COATING OF FABRICS

### TASK

Fabrics are often coated with silicone to protect them or to increase their gas-tightness. The thickness of the coating is usually determined by the weight of the application. However, as an average value, this area measurement says nothing about the local distribution or even the adhesion of the coating.

### SOLUTION

In such cases, Analytical Services Obernburg uses a special type of scanning electron microscopy (SEM). In this "material contrast", the coating appears brighter than the tissue and can therefore be clearly identified.

#### Industries

Fabric manufacturer  
Fiber manufacturer

#### Analysis targets

Coating thickness  
Penetration depth

#### Materials

Coated fabrics

#### Analysis methods

Scanning electron  
microscopy (SEM-EDX)



## **SOLUTION**

Fig. 1 (left) shows the coated front side of the fabric. The coating thickness is so thin on the fabric tips that the darker appearing fibers are clearly visible through the coating. It therefore only offers a rather low level of protection for the crests. On the other hand, the silicone has accumulated in the recesses of the fabric and forms the light-colored surface. On the reverse side of the fabric (Fig. 1, right), a small amount of the coating material (brightly illuminated) can be seen at the crossing points between the warp and weft threads, which has penetrated through the fabric.

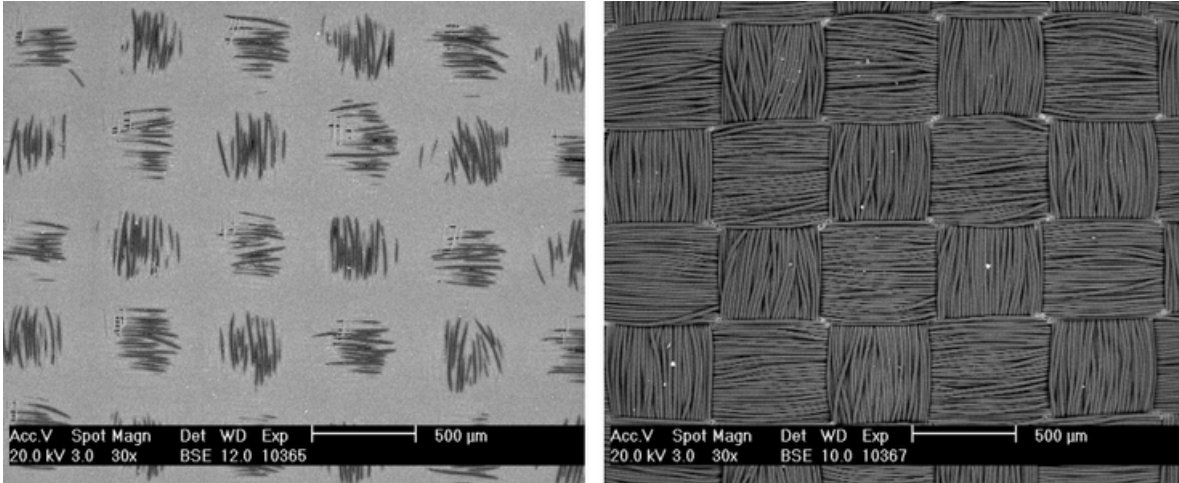
In the cross-section (Fig. 2), the thickness of the coating can be measured precisely at every point. As can already be assumed from the surface images (Fig. 1), the coating is completely absent on the fabric flaps. In addition, clear information can be obtained about the penetration depth of the coating into the thread composite (here 1-2 filament layers) and thus about the quality of the wetting and the resulting adhesion properties.

Possible defects within the coating or between the filament and the coating can also be examined in this way. In addition, X-ray microanalysis (SEM-EDX) can be used to determine the local element composition of the coating, making it possible to detect inhomogeneities (e.g. particle inclusions).

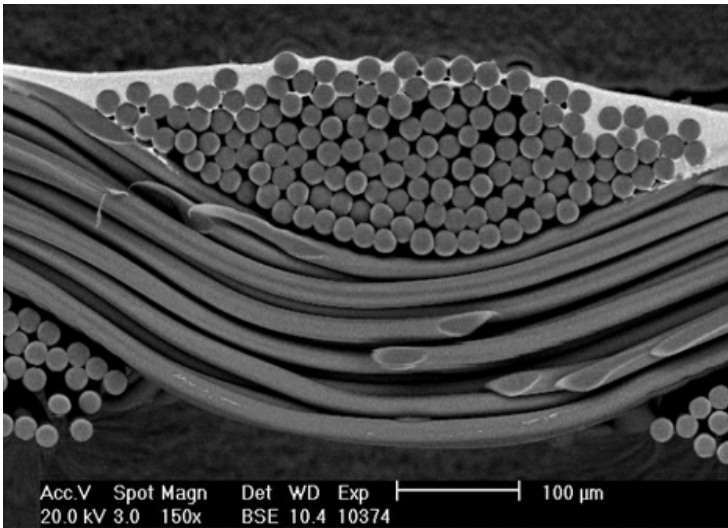
## **ADVANTAGE**

The method described allows precise visualization and analysis of the coating structure, possible defects and measurement of the local coating thickness. In addition, the adhesion mechanism can be investigated in more detail via the penetration depth of the coating into the thread composite. The method is also suitable for other types of coatings (e.g. PVC) or for analyzing laminates.

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**Fig 1: Front (left) and back (right) of an airbag fabric coated on one side with silicone.**



**Fig. 2: Cross-section through a fabric coated on one side with silicone**