

INCLUSION IN CABLE INSULATION

TASK

A darker foreign material was observed in transparent cable insulation. It is feared that this could influence the insulation effect. In order to assess the potential risk and narrow down the cause, the fault needs to be characterized.

SOLUTION

After an inspection at Analytik Service Obernburg, it was decided to create a simple cross-section with a scalpel due to the moderate size of the defect (Fig. 1)

Industries

Medical technology
Paint manufacturer
Compundeure

Analysis objectives

Particle size
Particle shape
Agglomeration
tendency

Materials

Powders
Suspensions

Analysis methods

Laser diffraction
scanning electron
microscopy (SEM-EDX)



SOLUTION

The defect was then analyzed using micro-Raman spectroscopy (see Fig. 2). While the insulation consists of a polyethylene (PE) (blue spectrum), the material of the defect (red spectrum) corresponds to a mixture of polyethylene (PE) and polytetrafluoroethylene (PTFE). A reference spectrum of PTFE (green spectrum) was added for better comparison.

PTFE, also known as Teflon, should also be a good insulator. The material information enables a more targeted approach in the search for the cause.

ADVANTAGES

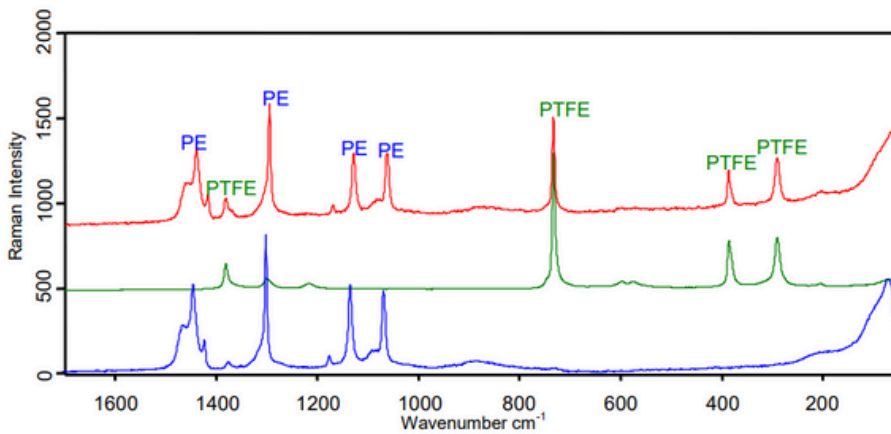
Microscopic Raman spectroscopy enables the analysis of small inclusions with a spatial resolution of a few micrometers. The measurement is non-contact. The method is particularly suitable for organic materials (e.g. polymers).

In addition to Raman spectroscopy, Analytik Service Obernburg also offers IR spectroscopy and scanning electron microscopy (SEM-EDX) for damage analysis.





Fig. 1: Cross section



Sample Name: Querschnitt: Kabelprobe 2, Einschussposition
Sample Name: Querschnitt: Kabelprobe 2, Referenzposition
Sample Name: PTFE zum Vergleich

Fig. 2

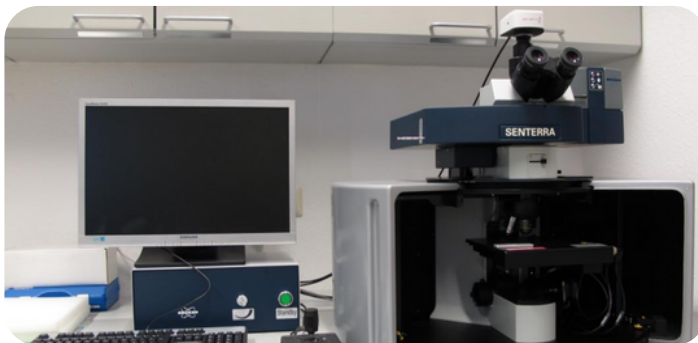


Fig. 3: Microscopic Raman spectroscopy