

## Identification of inorganic fibres in workplace air by SEM-EDS

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When assessing fibre dusts in the air at workplaces, it is crucial to identify and classify the type of fibre in order to distinguish carcinogenic fibres from others from an occupational health and safety perspective. Up to now, this has been done using an error-prone method of product fibre identification. The aim of the project is to create a database for determining the type of fibre independently of reference materials from the sampled work areas and, based on this, to define identification criteria.

Using available reference materials from the synthetic inorganic fibres used in work areas ( synthetic mineral fibres, high temperature wool, micro glass fibres, textile glass fibres, etc.), the range of element composition of the fibre types is determined by means of EDS analysis. In addition, systematic investigations are used to determine the quality of these analyses of fibres with diameters in the micrometre range, identify systematic problems and derive possible differentiation criteria. This database is supplemented by information from publications and manufacturer data, which have been structured for comparison with EDS analyses

A scheme was established that allows fibres in airborne dusts to be classified largely independently of reference materials. It is important not only to look at individual particles separately, but also to classify the fibres found on the basis of previous grouping.

The presented solution to the problem of identifying fibres shows the limits of manual classification. A further step will be the establishment of self-learning neural networks, which have already achieved successful results in initial tests in this area and provide constructive support for identification.

### **Keywords:**

fibres, workplace air, SEM/EDS, identification