

## Mineral lung dust

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Mineral dust is the cause for many diseases of the respiratory tract, including silicosis, asbestosis, and formation of pleural plaques or tumors. While most research has focused on distinct mineral particles like asbestos or different forms of silica, our aim is to focus on the overall human lung dust burden by performing a detailed mineralogical analysis of selected samples.

In our work we investigated the mineral particle burden in lung tissue samples obtained during autopsies from people who died from different types of lung diseases. We are comparing the various types of particles found in lung tissue of three patients with a pleural mesothelioma and of six people who succumbed to lung carcinoma. For one lung from a silicosis-affected patient we also analysed samples from all five lung lobes in an effort to gain a better understanding of the mechanisms of spatial particle distribution.

The tissue material was analyzed after removing all organic compounds. For particle identification, we combined the results of an automated scanning electron microscope (SEM) single-particle analysis method with the data obtained from manual particle analysis of at least 100 particles per sample by transmission electron microscope (TEM). Both electron microscopes are equipped with an energy-dispersive X-ray spectrometer (EDS). The data are also compared to results obtained from powder X-ray diffraction in those cases, where enough mineral dust was available.

So far, our investigation revealed that in addition to various types of asbestos, which are mainly found in the case of the mesothelioma patients but rarely in tissue from lungs affected by lung carcinoma, the samples contain many other minerals, including feldspars, quartz, rutile, clay minerals, micas, oxides, phosphates and carbonates. The samples derived from the five lung lobes of a silicosis case contain almost no quartz but rather potassium rich feldspars, micas and possibly endogenous phosphates.