

**Content**

Single particle analysis coupled to a novel data treatment tool (PACLA=Particle Classifier) for dust characterization in immission (source determination) and emission (fingerprint determination) samples.

Scanning electron microscopy (SEM) coupled to energy dispersive x-ray spectroscopy (EDX) is a highly effective method for the characterization of particles since it delivers information about both the morphology and the chemical composition of each single particle of a dust sample. Due to the full automatization of the method a large number of particles (hundreds to thousands) can be analyzed guarantying a remarkable representativeness of the results.

This newly developed method enables the analysis of particles from various environmental sectors (e.g. air and water).

The large amount of parameters, which result from single particle analysis brings, though, a strong disadvantage because it is extremely complex and time consuming to deal with and interpret such multi-dimensional data sets accounting for a large amount of parti-

cles (chemical and morphology data, grain size distribution etc). This is the reason why despite its great potential, single particle analysis has been used until now mainly for research purposes.

As a solution Particle Vision GmbH has developed a Particle Classifier software (PACLA) in collaboration with the Institute for data analysis and process design (IDP) at the Zurich School of Applied Sciences (ZHAW) and the University of Fribourg with the financial support of the Commission for Technology and Innovation (CTI). This new development makes possible large data sets to be analysed and interpreted quantitatively and efficiently (Fig. 1).

Single particle analysis with subsequent PACLA data treatment can be currently performed on Sigma-2 passive samples, Bergerhoff remains, polycarbonate filters, carbon tape lift samples and boron substrates.

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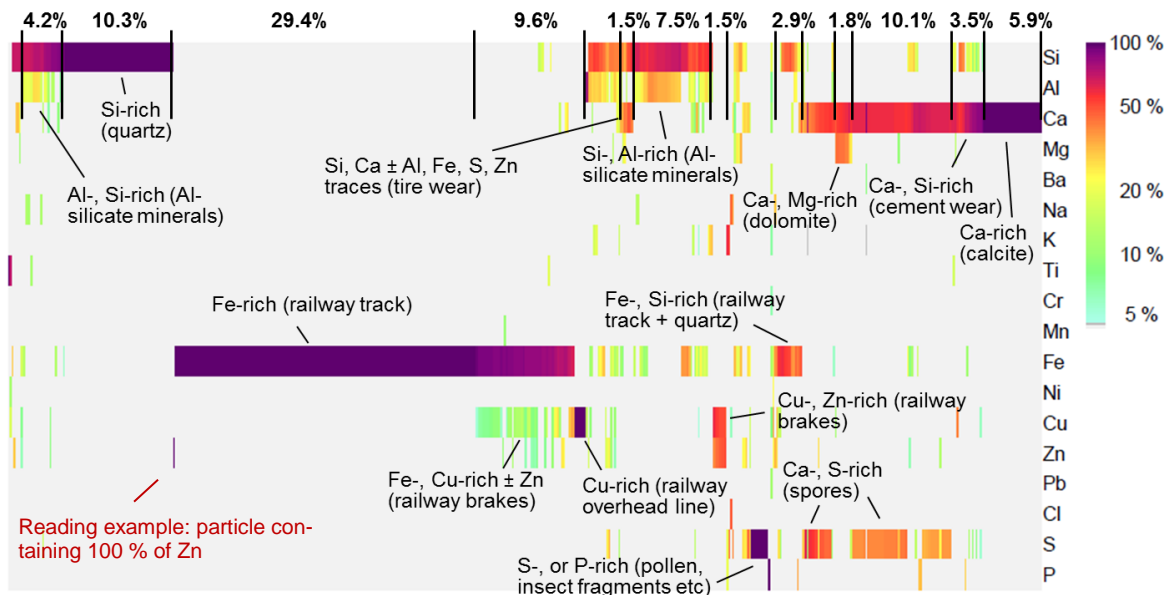


Fig. 1: PACLA heatmap from a railway site. Each column represents the elemental composition of a single particle (number of analysed particles: 543; particle size range: 1 - 10 µm; the % are given in particle number concentrations for each single chemical class. Alternatively, mass concentrations can be calculated.