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## Preliminary results of metal content analysis in the outdoor air of Berlin using an impactor prototype optimised for TXRF analysis

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Air pollution is responsible for a major part of environmental-related health impacts on humans. Aerosol particles in the inhalable size range account for the largest contribution. To improve air quality with targeted measures, it is necessary to precisely identify and minimise the emission sources of airborne particles. Data with high temporal resolution on the size fractionated chemical composition is of great value in this context, as it allows conclusions to be drawn about the emission sources of the particles.

Conventionally conducted filter samplings with subsequent chemical analysis of the collected aerosol particles usually cannot provide high time resolution, as the analytical methods used so far require a minimum amount of sample material.

Here, the development of a measurement approach that analyses aerosol particles using Total Reflection X-ray Fluorescence (TXRF) is presented. TXRF analysis is based on the reflection of a shallow incident X-ray beam on a reflective sample carrier loaded with aerosol particles. A high detection sensitivity for elements of high atomic numbers with a minimum sample quantity required characterises this method.

Particle collection is conducted by means of an impactor optimised for the measurement geometry of the TXRF spectrometer. Aerosol size fractions are deposited directly on the TXRF sample carrier for subsequent analysis. TXRF analysis can be performed by a compact tabletop device, which is also portable for use in the field directly after particle collection.

The coupling of a commercially available cascade impactor with a TXRF spectrometer has shown a high potential of this method. We further improve this by developing a cascade impactor specifically optimised for a TXRF spectrometer, in order to achieve the lowest possible detection limits. In our contribution, we present first TXRF analysis results of particles collected from outdoor air in Berlin using a prototype cascade impactor and outline the advantages as well as the challenges of this analytical approach.