



## **On-line measurements of particle-bound reactive oxygen species (ROS) in Beijing wintertime air**

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Reactive oxygen species (ROS), present in particles or generated by particle components upon deposition of particles in the human lung, are widely thought to be one of the main contributors to particle-related toxicity. However, there is so far only relatively little data available on their concentrations in ambient air, which makes it difficult to gauge their impact on air quality. Recent studies have shown that a large fraction of particle-bound ROS in secondary organic aerosol is relatively short-lived, with lifetimes of several minutes. Traditional off-line sampling with high-volume samplers is therefore likely to severely underestimate ROS concentrations, showing the need for using on-line instrumentation.

We have recently developed a compact on-line instrument for the measurement of particle-bound ROS (OPROSI). To measure ROS concentrations, particles are continuously extracted and the extract is reacted with 2',7'-dichlorofluorescein (DCFH) in presence of horseradish peroxidase (HRP). This leads to formation of a fluorescent dye, which is detected spectroscopically. The instrument allows for up to 16 h of continuous measurement with a time resolution of  $\leq 12$  min and a limit of detection of 3.85 nmol [H<sub>2</sub>O<sub>2</sub>] equivalent per m<sup>3</sup> air.

For this study, we have used the OPROSI to continuously measure the concentration of particle-bound ROS in Beijing wintertime air during the first half of the Air Pollution and Human Health in a Developing Megacity (APHH-Beijing) campaign in November and December 2016. Measured ROS data are compared with other air pollution parameters such as total particulate mass, ozone and NO<sub>x</sub> as well as with meteorological measurements such as temperature and humidity.