



A novel Aerosol-Into-Liquid Collector for online measurements of trace metal and elements in ambient particulate matter (PM)

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A novel monitor for online, in-situ measurement of several important metal species (i.e. Fe, Mn and Cr) in ambient fine and ultrafine particulate matter (PM) is developed based on a recent published high flow rate Aerosol-Into-Liquid Collector. This Aerosol-Into-Liquid Collector collects particles directly as highly concentrated slurry samples, and the concentrations of target metals in slurry samples are subsequently determined in a Micro Volume Flow Cell (MVFC) coupled with absorbance spectrophotometry to detect colored complexes coming from the reactions between target metals and specific reagents. Laboratory tests are conducted to evaluate the performance of the MVFC-absorbance system. The calibration curves of the system are determined using standard solutions prepared by serial dilution. As part of the evaluation, the effects of reaction time, reagent amount and interference on the system are also evaluated. Field evaluations of the online monitor will be performed to validate the ability of this new online sampler in near-continuous collection and measurements. Both laboratory and field evaluations of the novel monitor will indicate that it is an effective and valuable technology for PM collection and characterization of important metal species in ambient aerosols.