

# Uncertainty estimation of anions and cations measured by ion chromatography in fine urban ambient particles (PM 2.5)

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The present work presents a measurement uncertainty evaluation according to Guide to the Expression of Uncertainty in Measurement (GUM) of the concentration of the cations  $K^+$  and  $Li^+$  and anions  $NO_3^-$  and  $SO_4^{2-}$  in fine airborne particulate matter, refers to particles less than 2.5  $\mu m$  in diameter (PM 2.5), as measured by ion chromatography (US-EPA 300 method). The GUM method is not typically used to report uncertainty. In general, the analytical results only report the measurement's standard deviation under repetition as an uncertainty; thus, not all sources of uncertainty are considered. In this work, the major sources of uncertainty regarding the measurements were identified as contributions to linear least square regression lines, repeatability, precision, and trueness. The expanded uncertainty was approximately 20% for anions and cations. The largest contribution to uncertainty was found to be repeatability. © 2011 Springer-Verlag.