

## Measurement of Soil/Dust Arsenic by Gas-Phase Chemiluminescence

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### Abstract:

A gas phase chemiluminescence (GPCL) based method for trace measurement of arsenic has been recently described for the measurement of arsenic in water. The principle is based on the reduction of inorganic As to AsH<sub>3</sub> at a controlled pH (the choice of pH governs whether only As(III) or all inorganic As is converted) and the reaction of AsH<sub>3</sub> with O<sub>3</sub> to produce chemiluminescence (Anal. Chem. 78 (2006) 7088-7097). The same general principle has also been used in postcolumn reaction detection of As where As species are separated chromatographically, then converted into inorganic As by passing through a UV photochemical reactor followed by AsH<sub>3</sub> generation and CL reaction with ozone (Anal. Chem. 79 (2007) 9197-9204). In the present paper we describe the measurement of As in different soil and dust samples by serial extraction with water, citric acid, sulfuric acid and nitric acid. We also compare parallel measurements for total As by induction coupled plasma mass spectrometry (ICP-MS). As(V) was the only species found in our samples. The ICP-MS results were highly correlated with direct GPCL and LC-GPCL results ( $r^2 = 0.9999$  and  $0.9999$ , respectively). The limit of detection (LOD) in the extracts was 0.36 µg/L by direct GPCL compared to 0.1 µg/L by ICP-MS. In sulfuric acid based extracts, the LC-GPCL method provided LODs inferior to those previously observed for water based standards and were 2.6, 1.3, 6.7, and 6.4 µg/L for As(III), As(V), dimethylarsinic acid (DMA) and monomethylarsonic acid (MMA) respectively.

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