

Development of Miniature Mass Spectrometry for In-situ Characterization of the Environment

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This talk will present recent progress at Copenhagen University with the development of handheld, battery operated membrane inlet mass spectrometry for in-situ characterization of the environment. In particular a novel inlet system for fast screening of land sites for poly aromatic hydrocarbon (PAH) contamination in the soil will be presented together with the first in-situ applications. The complete analytical system has a total weight below 10 kg and analyses soil samples for their PAH content without any pretreatment with a turnover of 5-10 minutes per sample. Further, the first experiences with a recently acquired Mini-10 miniature mass spectrometer and its use as a mass selective detector to a miniature field transportable gas chromatograph (GC) will be presented. The field portable and battery operated micro GC (Varian CP4800) come with a thermal conductivity detector and will be interfaced to the Mini-10 via either a membrane inlet or a direct gas inlet system.

Quantification of a chemical plume using a moving sensor with a membrane covered interface is particular difficult, since the exposure time of the membrane covered sensor to the plume is unknown. If a steady state diffusion of sample molecules through the membrane is not achieved within the exposure time neither peak height nor peak area can be used alone for quantification. The talk will briefly address this matter and explain how a simple algorithm using both peak height and peak width as input can solve the problem.