OP 2.5

Gas Chromatography coupled to Microwave-induced Plasma Emission Detection (GC-MIP-PED) for the Speciation Analysis of Mercury

Stefan Trümpler[1], Eike Kleine-Benne[2] and Wolfgang Buscher[1]

[1]University of Münster, Institute of Inorganic and Analytical Chemistry, Corrensstrasse 30, 48149 Münster, Germany, Wolfgang.Buscher@uni-muenster.de
[2]Gerstel GmbH & Co.KG, Aktienstrasse 232-234, 45473 Mülheim/Ruhr, Germany

The plasma emission detector (PED) is based on a microwave induced plasma source (MIP) with optical emission detection. Hyphenated to a GC, the system allows for fast and robust detection of mercury for speciation analysis. In contrast to other MIP systems, the presented plasma source does not require complex water cooling. Moreover, the plasma source can cope with high loads of organic solvents.

Wavelength separation is achieved with an interference filter, oscillating in the light path between the plasma and the photo diode. This filter transmits only a small bandpass around the atomic mercury emission line at 253.652 nm. Its main characteristic is that tilting towards incoming radiation results in a shift of the transmission profile to lower wavelengths. By oscillation of the filter and modulation of the signal readout, an efficient background correction is achieved.

The advantage of the PED, compared to inductively coupled plasmas (ICP) is the low noble gas consumption. ICPs usually require around 15 L min^{-1} of argon, whereas the PED is able to create a stable plasma discharge with less than 0.1 L min^{-1} of helium.
The set-up of the system will be presented as well as analytical figures of merit. The detection limit reaches down to 1 pg Hg (absolute) in combination with a selectivity for mercury against carbon exceeding 10^6. The data show that selective and sensitive detection of mercury species can be realised with this system. As first samples, the results of the analyses of fish tissue shall be presented.