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**METHOD DEVELOPMENT FOR SPECIATION ANALYSIS OF VOLATILE
MERCURY FORMS IN AMBIENT AIR AND FLUE GASES FROM INCINERATION
PLANTS**

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Abstract

Flue gas from fossil fuels and waste combustion contains different oxides of carbon, nitrogen, sulfur, hydrogen halides, arsenic, dioxins, etc. and also considerable amounts of mercury. The new, tightened EU-limits for Hg-emissions from combustion processes will be applied also in the Czech Republic since 2021. The paper introduces the development of a new procedure for speciation analysis of gaseous mercury forms (Hg^0 (g), HgCl_2 (g), MeHg^+ (g)) in flue gas, biogas and ambient air. For the continuous measurement of Hg^0 , the VM-3000 UV spectrometer (Mercury Instrument) was employed. It measures the absorbance of cold vapors of elemental mercury at room temperature at wavelength 254 nm. However, it does not detect HgCl_2 vapors which form a significant fraction of Hg emissions particularly from waste incinerators [1,2]. Atomic absorption spectrometry (AAS) with heated quartz tube atomizer (900 °C) was used for determination of gaseous HgCl_2 . Potential of AAS for on-line speciation analysis of gaseous Hg^0 (non-heated atomizer) and HgCl_2 (heated atomizer) in flue gases will be discussed. The risk of transport losses and/or changes in speciation analysis during sampling will be shown. Direct separation of Hg gaseous species by gas chromatography with spectrometric detection will be outlined. In a pilot study, the possibility of pre-concentration of gaseous Hg species on the commercial Au-based amalgamator, followed by their gradual thermo-desorption, with subsequent spectrometric detection is investigated.

References

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