Abstract

Generation efficiency of four mercury species, namely elemental mercury and hydrides of methyl-, ethyl- and phenylmercury from liquid samples was quantified. The species chemically generated were quantitatively trapped on a gold-coated amalgamator to be subsequently determined by AMA-254 technique. Three types of construction of volatile species generators were compared. Generation effciciency among the species was comparable, fluctuating around 60% in the conventional flow injection generator equipped with a gas liquid separator with forced outlet. Better results were reached for elemental mercury and methylmercury hydride in an automated batch generator system. Generation efficiency was higher than 90% for these two species and between 60 to 80% for ethyl- and phenylmercury hydrides, respectively.

Speciation analysis of elemental mercury and sublimate in gaseous samples was optimized. These two species dominate in flue gases produced during coal combustion or waste incineration. Combination of two sorbent tubes packed with alumina and gold-coated alumina enables selective and quantitative retention of both species. Sublimate is trapped on a column packed with alumina while elemental mercury is retained on gold-coated alumina. The capacity of both sorbents was investigated as well as the effect of sorbent temperature on trapping efficiency of mercury species was studied. The applicability of the proposed method was demonstrated employing a model mixture of elemental mercury and sublimate.

Key words: mercury, speciation analysis, preconcentration, gold amalgamator, generation of volatile compounds