

## Author's Accepted Manuscript

Novel Hybrid Flow Platform for On-line Simultaneous Dynamic Fractionation and Evaluation of Mercury Lability in Environmental Solids

Yanlin Zhang, Manuel Miró, Spas D. Kolev



PII: S0039-9140(17)31028-7  
DOI: <https://doi.org/10.1016/j.talanta.2017.09.084>  
Reference: TAL17987

To appear in: *Talanta*

Received date: 27 August 2017  
Revised date: 27 September 2017  
Accepted date: 28 September 2017

Cite this article as: Yanlin Zhang, Manuel Miró and Spas D. Kolev, Novel Hybrid Flow Platform for On-line Simultaneous Dynamic Fractionation and Evaluation of Mercury Lability in Environmental Solids, *Talanta*, <https://doi.org/10.1016/j.talanta.2017.09.084>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Novel Hybrid Flow Platform for On-line Simultaneous Dynamic Fractionation and Evaluation of Mercury Lability in Environmental Solids

Yanlin Zhang,<sup>a</sup> Manuel Miró <sup>\*, b</sup> and Spas D. Kolev <sup>\*, a</sup>

<sup>a</sup>Centre for Aquatic Pollution Identification and Management (CAPIM), School of Chemistry, The University of Melbourne, Victoria 3010, Australia.

<sup>b</sup>FI-TRACE group, Department of Chemistry, Faculty of Science, University of the Balearic Islands, Carretera de Valldemossa km 7.5, E-07122, Palma de Mallorca, Spain

### ABSTRACT

A method for the automatic simultaneous assessment of mobility and lability of mercury in environmental solid samples has been developed for the first time. It has been implemented in a hybrid flow system integrating flow-through dynamic sequential extraction and on-line chemical digestion prior to atomic fluorescence detection. The method allows the determination of trace concentrations of labile mercury ( $Hg_L$ ) and non-labile mercury ( $Hg_{NL}$ ) in different bioaccessible phases of environmental solid samples thus providing expeditious data not only for Hg exposome studies but also for the selection of suitable environmental remediation techniques. The analytical procedure involves the sequential application of deionized water, 0.01 M  $HNO_3$  solution, 1 M KOH solution and solution containing both  $Na_2S$  and KOH ( $1 \text{ mol L}^{-1}$  each) to a solid sample packed in a column to release four Hg fractions according to their mobilities (i.e. water soluble, exchangeable, organic matter associated, and sulfide bound Hg) followed by the on-line determination of the concentrations of  $Hg_L$  and  $Hg_{NL}$  by flow programming. Apart from obtaining more comprehensive knowledge of risk exposure of Hg-laden solids, important advantages of the newly developed method compared to its batch-wise fractionation counterpart include (i) approximately 8-fold reduction in the time for acquisition of the dynamic extraction data, (ii) evaluation of the kinetics of release of Hg, (iii) Hg lability analysis, and (iv) minimization of matrix interferences and potential re-adsorption or transformation of the extracted Hg species.

Download English Version:

<https://daneshyari.com/en/article/5140440>

Download Persian Version:

<https://daneshyari.com/article/5140440>

[Daneshyari.com](https://daneshyari.com)