**Development of a novel passive sampler device for Hg monitoring in freshwaters based on a polymer inclusion membrane incorporating a task specific ionic liquid**

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In this work we have developed a new sorbent to collect mercury (Hg) present in natural waters based on a polymer inclusion membrane (PIM) containing the task specific ionic liquid (IL) trioctylmethylammonium thiosalicylate (TOMATS). ILs have gained increasing attention during the past decades because of their unique properties such as negligible vapor pressure, good thermal stability, or controllable miscibility. It is well known that compounds incorporating thiol groups have high affinity towards Hg(II). Thus, in our work, we have synthesized and characterized the IL TOMATS, and it has been incorporated in a PIM as a new binding phase in a passive sampler device.

TOMATS was prepared by mixing a volume of the commercial IL Aliquat 336 (trioctylmethylammonium chloride) dissolved in chloroform with sodium thiosalicilate salt. The mixture was shaken for 24 h, and washed several times with ultrapure water. This procedure was repeated until total chloride was exchanged by thiosalicilate. Afterwards, the solvent was removed, and the resulting compound (a highly viscous olive green oil) was characterized by means of several techniques such as one-dimension 1H-NMR, FTIR, elemental analysis and electrospray ionization-mass spectrometry (ESI-MS).

This IL has been fixed in a polymer inclusion membrane based on the polymer cellulose triacetate and TOMATS (50%, wt) providing stable and flexible films. These membranes were incorporated in house-manufactured diffusive gradients in thin films device (DGT) with polyacrylamide diffusive gel and were tested under controlled conditions using Hg solutions.

Time series experiments using Hg solutions were successfully carried out under controlled laboratory conditions. Moreover, to test its validity under environmental conditions and to measure the Hg concentration in the river *in situ*, several field studies were also carried out in different sampling sites of the Ebro River basin (NE Spain) affected by Hg wastes released by a chlor-alkali industry. We present here the new DGT-incorporating a PIM with the IL TOMATS developed to address the Hg lability at the different sites downstream the hot spot and to develop a relationship between chemical lability and bioavailability.

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