REGATA
Rede Galega de Tratamento de Augas

Research Stays 2015

Simultaneous speciation of Hg, Sn and Pb compounds by GC-PTV-ICP-MS

September 1st, 2015 | November 30th, 2015

Objectives

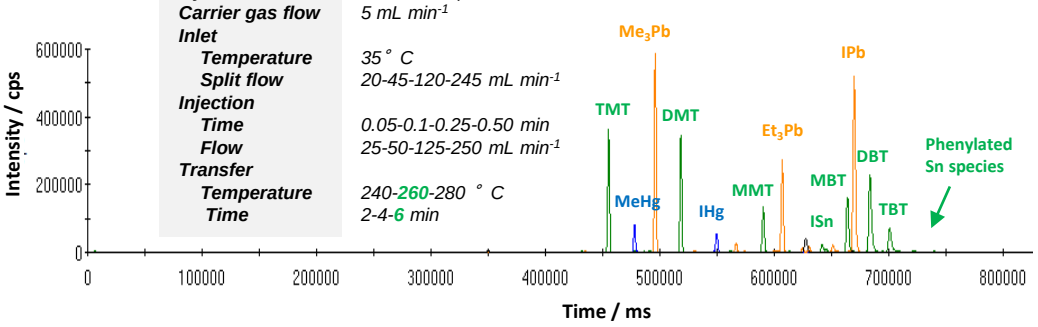
- Develope a **high sensitive** speciation method for the determination of ultratrace levels of Hg, Sn and Pb species (Inorganic Hg, MeHg, organotin compounds – MMT, DMT, TMT, MBT, DBT, TBT, MPhT, DPhT and TPhT – and organolead compounds – Me_3Pb and Et_3Pb), **simultaneously**.
- Natural concentrations of these compounds are in the **ng L^{-1} range** or **less**. They are included in the list of priority substances according to the **EU Directive 2013/39/EU** in the field of **water policy**.

Methodology

- A commercial GC-ICP-MS interface (Thermo Elemental) was used to couple a Thermo Electron Gas Chromatography to a Thermo Electron ICP-MS (X7 series).
- A programmed temperature vaporization (PTV) injector was used, which enabled the injection of a large sample volume without loss of analyte. This allows us to reach low detection/quantification limits.
- Acetic acid/sodium acetate buffer was added to standards/samples, and the pH was adjusted to 5.
- Hexane and $NaBPr_4$ (derivatization reaction to transform the analyte compounds into volatile species) were added. The flask was shaken for 15 min. and the organic phase was transferred to an injection vial.

Results

Injection Volume	*5-10-**25**-50 µl*
Carrier gas flow	*5 mL min^{-1}*
Inlet	
Temperature	*35 ° C*
Split flow	*20-45-120-245 mL min^{-1}*
Injection	
Time	*0.05-0.1-0.25-0.50 min*
Flow	*25-50-125-250 mL min^{-1}*
Transfer	
Temperature	*240-**260**-280 ° C*
Time	*2-4-**6** min*



- A study of the influence of different paramenters was done to reach the **best conditions**. Results were compared with a study without PTV injection that we developed previously.

Highlights and Future Work

- Good results in terms of the separation and identification of species.
- Try to improve phenylated Sn species detection using other organic phase in PTV inlet.

Researcher

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