

CORRECTION METHOD OF ISOTOPE RATIO MEASUREMENTS

Correction method for computing precise and reproducible measurements of isotope ratios

Isotope ratio ■ Mass spectrometer ■ MC-ICPMS

APPLICATIONS

- Data processing of isotope ratio measures in mass spectrometers

DEVELOPMENT PHASE

Method of correction finalized and efficiently tested

PUBLICATIONS

"Method for isotope ratio drift correction by internal amplifier signal synchronization in MC-ICPMS transient signals" Alkiviadis Gourgiotis et. al., J. Anal. At. Spectrom., 2014,29, 1607-1617

INTELLECTUAL PROPERTY

European patent application : EP2874177

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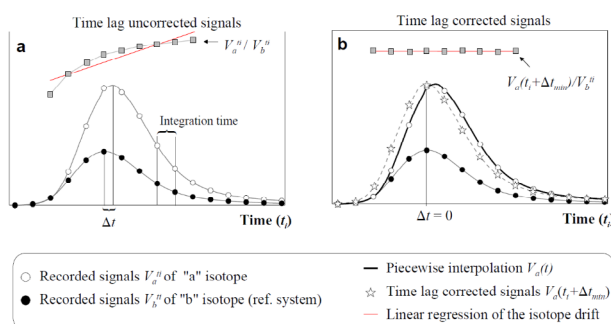
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PRESENTATION

Measuring isotope ratios is a very powerful technique to determine the characteristics and the history of a sample of matter. For example, measuring the ratio of two carbon isotopes (Carbon-14 and Carbon-12) within a fossil determines its geological age. Plenty of other applications can be found, such as in nuclear industry, environment monitoring, cosmetic industry and even forgery detection in art paintings.

Multiple collector - inductively coupled plasma - mass spectrometry (MC-ICPMS) is a best-in-class equipment to determine such isotope ratios as it works with a wide range of chemical elements and has very low detection thresholds. Samples of matters need to be prepared before being fed to the MC-ICPMS, either through a hyphenation technique (GC, HPLC, electrophoresis, ...) or a particular sample introduction (flow injection, laser ablation, ...). The problem is that this preparation step introduces an isotope ratio drift due to a time lag (Δt in the picture) between the measurements of the different isotopes, making results difficult to interpret.

Our mathematical model calculates and compensates the time lag due to the collector-amplifier system imperfections. Classical techniques to determine the isotopic ratio (point by point method or linear regression method) can then be used. The intern incertitude and the trueness are highly improved. This efficient correction method does not need any intervention on the instrument (calibration...) and can easily be integrated as an add-on to the MC-ICPMS software for data treatment.



Correction of isotope ratio drift - © 2014 Alkiviadis Gourgiotis

COMPETITIVE ADVANTAGES

- Software solution to compensate hardware imperfections
- No calibration or any intervention on the instrument is needed
- Trueness and intern incertitude highly improved