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Coupling of chromatographic techniques to Multicollector ICPMS to detect isotopic variations in complex mixtures

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Stable isotopes, such as C, N and O are successfully used as classical environmental tracers. During the last few years, heavy stable isotopes are getting more and more attention as tracers and proxies in biogeochemical and environmental studies. Multi-collector Inductively Coupled Plasma Mass Spectrometry (MC-ICPMS) has enabled scientists to obtain high precision isotopic analyses of heavy stable elements such as S, Cl, Ca, Fe, Cu, Zn, Hg and Pb. These isotopic systems can be used as important tracers in studying metal contaminants, biomedical processes and pollution of aquatic environments.

The advantage of the ICP source is that it can ionize all elements with very high sensitivity. Various separation technologies can be combined with mass spectrometry, like gas chromatography (GC) and liquid chromatography (LC) to analyze isotopic variations in complex biomedical, biogeochemical and environmental samples. These chromatographic techniques separate complex matrices into their constituents and the elemental species of interest. Additionally, these techniques allow the analysis of small samples (down to a few ng) and since these are on-line techniques, the amount of sample preparation is significantly reduced. This study discusses applications of chromatographic techniques coupled to the NEPTUNE MC-ICPMS.