

Reconstructing the past, understanding the present and predicting the future based on isotopic analysis via multi-collector ICP - mass spectrometry

Multi-collector ICP – mass spectrometry is a dedicated tool for the highly precise isotopic analysis of metallic and metalloid elements. Isotopic analysis of the light elements H, C, N, O and S is already relied on for decades in varying research fields. For metallic and metalloid elements, it was believed for a long time that the isotopic composition was fixed, except for elements (e.g., Sr, Pb) with one or more radiogenic nuclides (nuclides produced by radioactive decay) and for the lightest elements (e.g., Li, B) that are prone to isotope fractionation. More recent research, however, has made clear that all elements with 2 or more isotopes show natural variation in their isotopic composition as a result of fractionation. Isotopic analysis of both more traditional (Sr, Pb) and the so-called non-traditional isotopic systems provide a wealth of information that can be relied upon to reconstruct the past and understand the present, as will be demonstrated by real-life applications. As a final challenge, it will be discussed whether isotopic analysis can also predict the future...