

A high-performance method for the accurate and precise determination of zinc isotopic ratios in zinc-rich minerals using MC-ICP-MS

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In this study, an efficient method for direct determination of zinc isotopes in zinc rich minerals by multi collector inductively coupled plasma mass spectrometry (MC-ICP-MS) without column chromatography is proposed. Comparative experiments (with or without column chromatography) were conducted to evaluate whether unbiased zinc isotope ratios can be obtained directly by MC-ICP-MS. For zinc isotopes not determined by column chromatography, use the standard sample bracket (SSB) with copper as the internal standard to correct the mass deviation of the instrument. Compared with the minerals determined by column chromatography, the content of zinc rich minerals not determined by column chromatography is higher $\delta^{66}\text{Zn}$ and $\delta^{67}\text{Zn}$ value has little drift, while $\Delta^{66}\text{Zn}$ was not determined by column chromatography – ranging from -0.04 to + 0.01 ‰, $\Delta^{67}\text{Zn}$ ranges from -0.06 to + 0.01 ‰. These results show that due to the low content of unnecessary matrix elements, the zinc isotope ratio in zinc rich minerals can be achieved without deviation without column chromatography. In the wet plasma mode, the effects of acidity and concentration mismatch and matrix effect were strictly evaluated.

