

# Improved Chromatography for Isolating Highly Purified Calcium for Isotope Measurement

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The determination of Ca isotope ratios by Multi-Collector Inductively Coupled Plasma Mass Spectrometry (MC-ICPMS) can be sensitive to the matrix effect, especially that is generated by elements such as Cr, REEs, which leads to a deviation in Ca isotope compositions. Previous methods using dilute HCl medium and strong acid cation exchange resin can achieve high-efficiency separation of most matrix elements from Ca, except some elements like Cr and Al. Here we develop an improved method using HCl medium based on AG50W-X12 cation exchange resin. For the first step, 2mol/L HCl is used, where Ca is efficiently separated from most matrix elements except Cr, Al, Rb, Ga, U and Cs. For the second step, 10mol/L HCl is used, where Cr and Al (probably Rb, Ga, U and Cs as well) can be efficiently separated from Ca. Ca recovery is ~100%.  $\delta^{44/42}\text{Ca}$  of geological reference materials (including high-Cr JP-1) after column separation was determined using MC-ICPMS, with the results consistent with the published values using double-spike TIMS methods. Our improved chromatography enables to obtain highly purified Ca, suitable for Ca isotope measurements of nearly all types of geological materials including rocks, ores and water.