P-23

Poster Session Day 2

Separate Extraction of Strontium and Barium in Calcite and Dolomite in Carbonate Rocks

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Isotope geochemistry on carbonate rocks relies on acid digestion to a large extent, while the accurate determination of isotopic signal from carbonate mineral species still requires methodology development. Focusing on extracting Sr and Ba isotopes from calcite and dolomite in carbonates, we tested a 10-step sequential leaching method to separately dissolve these two minerals based on their different reactivities to dilute acetic acid. A group of mineral samples and a group of rock samples were selected for the experiment. The flat pattern of Sr released from both calcite and dolomite mineral samples indicates its uniform distribution in the two carbonate minerals, showing agreement with previous conclusion that Sr ions structurally incorporate to carbonate lattice in substitution for Ca ions [1]. For carbonate rock samples, both Sr and Ba concentrations present linear correlations with the contribution ratio of calcite and dolomite, as well as Ca/(Mg+Ca) ratio dissolved in each step of leaching, allowing the calculation of their concentrations in the two minerals by regression. Although the result of Ba in mineral samples shows similarity to that of Sr, its dissolution pattern from natural rocks is more likely to suffer from non-carbonate interference. According to the results of the leaching experiment, we design a procedure for the extraction of Sr and Ba in calcite and dolomite. The same approach may be useful for reliable extraction of carbonate associated sulfate, phosphate and nitrate.

References

[1] Pingitore, N.E., Lytle, F.W., Davies, B.M., Eastman, M.P., Eller, P.G., and Larson, E.M. (1992) Mode of Incorporation of Sr^{2+} in Calcite - Determination by X-Ray Absorption-Spectroscopy. Geochimica et Cosmochimica Acta 56, 1531-1538.