

Barium isotopic compositions in thirty-four geological reference materials analyzed by MC-ICP-MS

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Measurement of Ba isotope ratios of widely available reference materials is required for comparison of data obtained in different laboratories. Here we present new Ba isotope data for thirty-four geological reference materials including silicates, carbonates, river/marine sediments, and soils. These standard materials cover a wide range of compositions, with Ba concentrations ranging from 6.4 to 1900 ppm, SiO₂ from 0.62 to 90.36 wt.%, and MgO from 0.08 to 41.03 wt.%.

Accuracy and precision of our data were assessed by the analyses of duplicated samples and USGS rock standards using different sample dissolution methods. Barium isotopic compositions for all standard materials using HClO₄ dissolution or not are in agreement with each other within uncertainties. The variation of $\delta^{137/134}\text{Ba}$ in these reference standards is up to 0.5‰. The shale standard affected by high degree of chemical weathering processes has the highest $\delta^{137/134}\text{Ba}$ ($0.27 \pm 0.03\text{‰}$), while the stream sediment obtained from a tributary draining carbonate rocks is characterized by the lowest $\delta^{137/134}\text{Ba}$ ($-0.23 \pm 0.05\text{‰}$). The well-calibrated standards with matrices matching natural samples can be used to reduce the interlaboratory mass bias and broaden the application of Ba isotope system in variable geochemical processes.