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Developing Analytical Technique to Measure Stable and Radiogenic Strontium Isotope Ratios Using Thermal Ionization Mass Spectrometry with a Sr Double Spike Method (TIMS-DS) NADIA ELHAMEL, Graduate student, MICHAEL WIESER, Associate Professor — Variation in strontium isotope abundances is caused by mass dependent physical and chemical processes and the radiogenic decay of ^{87}Rb to ^{87}Sr. Up to now, most isotope abundance determinations have focused on the n(^{87}Sr)/n(^{86}Sr) ratio. It was assumed that changes in the n (^{88}Sr)/n (^{86}Sr) ratios would be very small. In addition, the custom has been to ignore variations in n(^{88}Sr)/n(^{86}Sr) ratios by assuming a fixed ratio, which was necessary to correct for instrumental mass biases. Recently, however, it was observed that small, but significant variations in the relative amounts of the non-radiogenic isotopes could have applications in geochemistry and archaeology. Therefore, an analytical method using a strontium double spike was developed to measure the both ratios on TIMS. Using this technique, the results obtained for the SRM987 reference material are in agreement with published data. However, IAPSO sea water standard measurement revealed an enrichment in the n(^{88}Sr)/n(^{86}Sr) ratio relative to SRM987 of 0.04 % and an accurate n(^{87}Sr)/n(^{86}Sr) ratio of 0.709325(27), which is significantly different from the n(^{87}Sr)/n(^{86}Sr) ratio of 0.709191(37), which is found when assuming a fixed ratio. The use of a double spike method for measuring strontium isotopic composition will reveal important insights into mass dependent processes that occur as this element moves through a particular system as well as provide accurate data for the radiogenic strontium isotope ratio.

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