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Li Isotopic Investigations of the Crust and Mantle

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Abstract

Li Isotopic Investigations of the Crust and Mantle

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Lithium, the lightest lithophile element, is fluid mobile. The large mass difference between its two isotopes makes measurement of the Li isotopic ratio a powerful tool for tracing fluid processes in the Earth. This project will complete Li isotope investigations of peridotite and eclogite xenoliths from the mantle and sedimentary and granitic rocks from the continents. The goal is to understand the role that fluid processes play in the growth of the continental lithosphere and to evaluate the inventory of Li isotopes in major solid Earth reservoirs in order to constrain Li isotope mass balance in the Earth system. The Li isotopic measurements will be performed using MC-ICP-MS methodology on solutions of rocks and minerals. The PIs have established this technique at Maryland and are routinely able to measure 40 ng or smaller Li fractions to plus or minus1 per mil precision (2 sigma). The newly acquired data sets will provide insights into the processes that control the Li isotopic composition of the crust and mantle, define the d7Li of potential contributors to subduction zone magmas and, ultimately, the influence of crustal recycling on d7Li of the mantle over time.

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