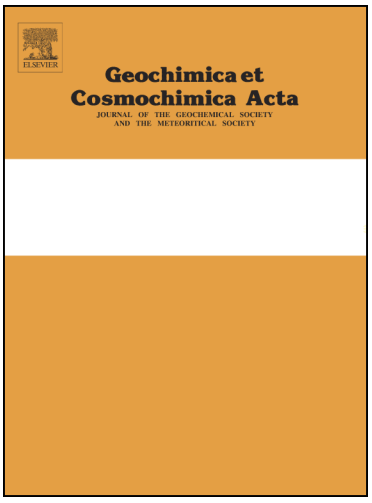


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Shelby T. Rader, Frank K. Mazdab, Mark D. Barton

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# MINERALOGICAL THALLIUM GEOCHEMISTRY AND ISOTOPE VARIATIONS FROM IGNEOUS, METAMORPHIC, AND METASOMATIC SYSTEMS

Shelby T. Rader*, Frank K. Mazdab, Mark D. Barton

Department of Geosciences and Lowell Institute for Mineral Resources, University of Arizona, Tucson, Arizona

*Corresponding author. Present address: Shelby T. Rader, Department of Environmental, Earth, and Atmospheric Sciences, University of Massachusetts Lowell, Lowell, MA 01854.

E-mail: shelby_rader@uml.edu (S.T. Rader)

## ABSTRACT

This study presents new thallium (Tl) concentration and isotopic composition data for potassium feldspar (K-feldspar), micas, sulfides, and other minerals using solution multi-collector inductively-coupled plasma mass spectrometry (MC-ICP-MS). The samples studied represent a diverse set of igneous, metamorphic, and metasomatic rock types. Purified separates of minerals anticipated to be Tl-bearing were analyzed; in many cases coexisting minerals were measured to examine the distribution of Tl and its isotopes between coexisting phases. This study is the first of its kind to document mineralogical controls on Tl chemical and isotopic fractionation.

Thallium contents in rock-forming minerals and common sulfides vary from below detection limit (here, approximately 0.2 ppm Tl in the mineral utilizing an IsoProbe MC-ICP-MS) to 3200 ppm. In this present study, mica and feldspar samples can reach Tl concentrations well over 20 ppm, compared to only 0.7 ppm in average crust. In contrast, only 14 of 38 common sulfide samples contain Tl at levels above the detection limit. Measured Tl isotope ratios, reported as