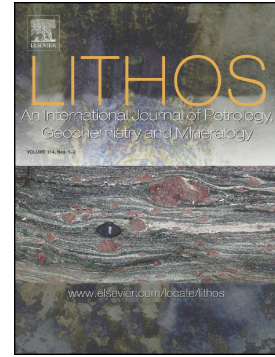


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# Insights into the Mantle Geochemistry of Scandium from a Meta-Analysis of Garnet Data

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## Abstract

The meta-analysis of about 13,000 analyses of scandium content in garnet grains shows that, below the spinel–garnet transition, this phase carries about three-quarters of the Sc budget of the mantle, indicating its control on Sc mobility. The Sc content of garnets in mafic rocks is low, due to a dilution effect resulting from their high modal content in garnet. Garnets from ultramafic rocks exhibit a wider range of Sc concentrations. We assess the relative influence of thermobarometry, crystal chemistry and fluid-related events on the distribution of Sc in garnet from such rocks to improve the tracking of geochemical processes in the mantle. Pressure and temperature of equilibration in the mantle are second-order factors influencing the Sc content of garnet, while crystal-chemistry, in particular  $\frac{Cr}{Cr+Al}$  and  $\frac{Ca}{Ca+Mg}$ , is the main

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