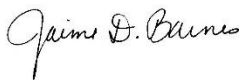# ORIGINS OF RODINGITE FORMING FLUIDS FROM THE SEAFLOOR TO EXHUMED TERRANES: INSIGHTS FROM CA, SR, &, O ISOTOPES

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ABSTRACT

Rodingites are a Ca-rich, Si-poor rock of mafic origin that represent the mobilization of Ca^{2+} in serpentinizing fluids from peridotites. Ca-garnet is the first phase to crystallize during rodingitization followed by secondary Ca-rich minerals (e.g., cpx). Given that rodingization may occur in many stages throughout the evolution of an ophiolite, rodingites may be a useful tool for tracing the fluids associated with serpentinization. Using Ca isotopes ($\delta^{44/40}Ca_{SRM915a}$) to address the origin and effects of rodingite-forming fluids has been reserved to one study that concluded rodingites formed without the input of seawater and that isotopic variation was consistent with inter-mineral fractionation at high-temperatures. In addition, it was concluded that the re-distribution of elements like Ca and Sr occurs on a local scale between the serpentinizing mantle peridotite and the mafic protolith.

We present Ca, Sr, and O isotope data of rodingites from multiple tectonic settings to represent the evolution of an ophiolite from altered Mid-Atlantic ridge (MAR) seafloor to obducted (Apennines) and exhumed Western Alpine terranes (Voltri, Zermatt-Saas, Lanzo). $\delta^{44/40}Ca$ values of plagioclase (plg) and pyroxene (pyx) from the seafloor span a range of ~0.2‰ (plg n=2, pyx=1) while garnet (grt) and clinopyroxene (cpx) span ~2.8‰ for Alpine rodingites (grt n=8, cpx n=7). $^{87/86}Sr$ ratios of mineral separates from the seafloor span from 0.702606 to 0.703700 (plg n=2, pyx n=1) and 0.703300 to 0.710559 for Alpines rodingites (grt n=8, cpx n=5). Lastly, $\delta^{18}O$ values span ~1.6‰ for the seafloor (plg n=2, pyx n=2) and ~6.3‰ for Alpine rodingites (grt n=11, cpx n=10). Mixing plots for Ca-Sr and Sr-O isotopes show distinct trends between reported mantle and seawater values, unlike previous studies concluded. Additional mixing plots of carbonate-derived sediment fluids were calculated to explore the outliers from the dataset: Erro-Tobbio (grt=2.52± 0.06‰) and Lago di Cignana (cpx=-0.32±0.06‰).

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