



Variation of Sr and Pb isotopes in megacrystic K-Feldspar from the Cathedral Peak Granodiorite, California

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Why megacrystic textures develop in silicic igneous rocks is still unknown. In-situ micro-drilling of K-feldspar megacrysts from the Late Cretaceous Cathedral Peak Granodiorite of the Tuolumne Intrusive Suite, California, provided material to study Sr and Pb isotopic compositions and trace element variation recorded by these crystals. Both cores and rims of megacrysts have isotopic signatures similar to previously published whole-rock values of the Cathedral Peak Granodiorite. Excursions in isotopic ratios demonstrate that crystal transects are not homogeneous, indicating that the megacrysts crystallized in an open-system environment. However, variations in radiogenic isotopes of K-feldspars are not large as observed in other plutonic and volcanic settings, suggesting large scale magma mixing and contamination did not occur in the Cathedral Peak Granodiorite. Modeling of K-feldspar trace element concentration profiles in a closed system fails to mimic profiles observed in the megacrysts. This adds to the interpretation that the megacrysts coarsened late in the Tuolumne Intrusive Suite's history, rather than early nucleation and long-term growth.