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Title: When does a granite become granitic? A record of major and accessory mineral re-equilibration from super- to sub-solidus within the Half Dome Granodiorite, Sierra Nevada, CA.

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The Tuolumne Intrusive Suite (TIS), Sierra Nevada, California, accumulated magmatic rock from 95 to 85 Ma. Ar-Ar biotite dates require that temperatures within the TIS remained above ~300°C until ~79 million years ago. The protracted thermal history resulted in five texturally and chemically distinct units that young towards the center and was recorded by chemical and isotopic re-equilibration of the minerals. Challener and Glazner (2017) demonstrated that amphibole phenocrysts from the Half Dome Granodiorite (Khd) experienced greenschist-facies metamorphism. Amphibole phenocrysts host abundant inclusions of biotite, chlorite, feldspar, titanite, epidote, and apatite, which are interpreted to have crystallized via breakdown of magnesiohornblende. Additionally, Al zoning suggests fracturing and subsequent healing of the amphibole crystals occurred at near- or subsolidus temperatures. New EPMA and LASS-ICP-MS analyses of texturally related amphibole, titanite, feldspar, and biotite from the equigranular Khd place limits on the timing of amphibole breakdown and contextualize the low-temperature re-equilibration of many of the major minerals in the rock. Most of the amphiboles analyzed contain 0.5–6 wt. % Al_2O_3 corresponding to actinolite compositions, while feldspar pairs record ~475 ºC apparent temperatures. Titanite grains (re)crystallized between 91–80 Ma and contain 25–825 ppm Zr, which correspond to apparent temperatures between 550–710 ºC (150 ± 50 MPa, $aTiO_2$ = 0.5 ± 0.1). The distribution of Zr in titanites is bimodal with the majority having <200 ppm Zr. Titanites younger than 87 Ma have decreasing Zr content and titanites included within actinolite amphibole contain the lowest Zr content (25–50 ppm) and youngest dates (85–80 Ma). Melt-present crystallization of titanite began at ~91–90 Ma, followed by both near and subsolidus (re)crystallization from ~88–86, concluding with titanite growth via hornblende breakdown from 82–80 Ma. These data taken together with previous investigations provide a continuous record of the rock's chemical evolution driven by incremental emplacement and subsequent episodic autometamorphism of the equigranular Khd, and critically, any inferences regarding magmatic processes in the TIS must first account for the metamorphic re-equilibration of the rock.