GSA Connects 2022 meeting in Denver, Colorado

Paper No. 124-7
Presentation Time: 2:00 PM-6:00 PM

CHEMICAL HETEROGENEITY IN PHENGITE FROM THE ULTRAHIGH-PRESSURE GNEISS, TSO MORARI TERRANE, INDIA

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The white mica, phengite, is a hydrous, high-pressure mineral that can preserve the chemical signatures of the fluids present during its growth in high pressure environments. The Tso Morari Ultrahigh Pressure (UHP) Terrane in NW India contains a large compositional range of phengite. It is also well suited for researching the importance and origin of fluids within subduction zones because it preserves early and deeply subducted rocks. The samples are primarily white-mica-bearing, quartzo-feldspathic gneiss. Six gneiss samples collected along a 10 m traverse. Mica within each sample were analyzed for mineral chemistry and size ratio of grains. Sample numbering increases with closeness to an eclogite block with TM1 furthest away and TM11 closest. Phengite samples > 5 m from the contact with the eclogite preserved the highest silicon concentrations (6.98 Si p.f.u.) while samples at the contact (TM11) and 2-3 m away preserve intermediate compositions between muscovite and phengite (6.45 Si p.f.u.). The grains in TM2 all have Si averages of 6.88 p.f.u., suggesting most crystals grew in the UHP event. The compositions of mica grains in TM3 and TM11 have similar Si concentrations of 6.42 Si p.f.u. Suggesting a recrystallization event during exhumation. FeT/Mg data shows increasing values from TM2 to TM11, from 2.67 to 6.1 with TM3 at an intermediate value of 4.05. The ~10 traverse preserves heterogeneous phengite compositions. If we consider the Si and FeT/Mg values as markers of pressure and temperature respectively we have grains that grew at both at near peak conditions and during exhumation. In this preliminary part of the study white mica (phengite) is the primary mineral used because it is a hydrous, high pressure phase that characteristically contains boron when tourmaline is absent. Initial electron probe data has confirmed both high pressure phengite and retrograde lower pressure phengite in the samples. The next steps will be to determine if the micas have distinct *in situ* δ11B concentrations. Previous studies suggest that the phengite would have low boron concentrations and highly negative δ11B values that are below the range of values expected by MORB basalts and the mantle.

Session No. 124--Booth# 7

T68. Sigma Gamma Epsilon Student Research Exhibition (Posters)
Monday, 10 October 2022: 2:00 PM-6:00 PM

Exhibit Hall F (Colorado Convention Center)

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Back to: T68. Sigma Gamma Epsilon Student Research Exhibition (Posters)

<< Previous Abstract | Next Abstract >>