ABSTRACT

TITLE:	Investigation of the Mineral Assemblages,and History of Skarn at Diorite Peak, La Plata Mountains, Colorado
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ABSTRACT: Skarns found within a small study area in the Cutler and Dolores formations contain unique mineralogies due to intruding Monzonite-Monzodiorite dikes and sills. The high grade skarn mineralization was found to be commonly controlled by individual layers within bedding planes that contain carbonate and are more chemically reactive under elevated temperatures. Skarn minerals found in the study area include diopside, epidote, adularia, chlorite, scapolite, hornblende, zoned garnet, calcite, quartz and specular hematite. Overall metamorphic history for the outcrop is complex, however, a clear progression of the timing of when individual minerals crystallized from protolith can be seen during different stages of cooling. Crystallization history was interpreted using the petrographic microscope and the peragenetic sequence is as follows: diopside, garnet, calcite, scapolite, hornblende, chlorite, and finally adularia. Minerals that are at equilibrium with one another as well as individual minerals can be used to acquire temperature data due to their chemical stabilities under specific temperatures and pressures. A lower maximum temperature threshold can be set at around 500C due to the formation temperature for diopside. Due to a previous study by Dr. David Gonzales, an upper maximum threshold has also been set at 650C due to the lack of reset detrital zircons. Simple lithostatic pressure calculation was completed for the outcrop, which falls within 0.062gpa-0.078gpa. This indicates the rocks within the study area were buried no more than a few kilometers and were relatively shallow during magmatic emplacement. Whole rock analysis using X-ray fluorescence of metamorphic rocks compared to unmetamorphozed protolith indicates an enrichment in K and Na, which is indicative of alkali metasomatism and possible influence of magmatic fluids. Other indications that fluids may have influenced mineralization is the high amounts of Cl within scapolite lattice, the formation of adularia, and flowing bands of hydrous minerals such as epidote and hornblende.