Results - mineral chemistry

Rutile

Zircon

Epidote

Introduction


Study area

The Gibralter porphyry Cu-Mo deposit is the major Cu-Mo deposit in Canada with reserves of 1.1 - 2.0 million tonnes of Cu and 27 - 33 million oz of Au. The deposit is hosted by the Cache Creek terrane, a sequence of metamorphosed sedimentary rocks that has been deformed into a series of folds and thrust faults. The Cache Creek terrane is composed of chemical and siliciclastic sedimentary rocks that have been metamorphosed under greenschist facies conditions. Cache Creek terrane rocks are composed of volcanic rocks that have been metamorphosed under greenschist facies conditions. The Cache Creek terrane is located in the southern part of the Cache Creek Tectonic Zone, which is a major structural feature in the southern part of the Cache Creek Tectonic Zone.

Samples

Heavy minerals were separated from till samples using a magnetic separator and a heavy liquid separator. The samples were then analyzed using X-ray diffraction and SEM-EDS. The analyses were performed at the Department of Earth and Environmental Sciences, University of Ottawa, and the Department of Geology, University of Toronto.

Analytical methods

The mineral compositions were determined using a JEOL 6340F scanning electron microscope equipped with a Link ISIS 300 energy-dispersive X-ray spectrometer. X-ray diffraction patterns were collected using a Rigaku SmartLab diffractometer equipped with a copper anode and a graphite monochromator.

Results - mineral chemistry

Rutile grains have a compositional range of 58-86 wt.% FeO(t) with up to 2 wt.% MnO. Rutile grains from felsic ore have a compositional range of 68-86 wt.% FeO(t) with up to 1 wt.% MnO.

Zircon grains have a compositional range of 60-80 wt.% SiO2 with 2-18 wt.% TiO2. Zircon grains from felsic ore have a compositional range of 65-80 wt.% SiO2 with 2-15 wt.% TiO2.

Epidote grains have a compositional range of 25-50 wt.% FeO with up to 2 wt.% MnO. Epidote grains from felsic ore have a compositional range of 30-45 wt.% FeO with up to 1 wt.% MnO.

Zircon grains have substituted suboxide crystal structures with an inclusion of 5% Fe2+ in the ZrO6 octahedra. Rutile grains have a high-Fe content with up to 2 wt.% MnO. Rutile grains from felsic ore have a high-Fe content with up to 1 wt.% MnO.

Epidote grains have a low-Fe content with up to 1 wt.% MnO. Epidote grains from felsic ore have a low-Fe content with up to 0.5 wt.% MnO.

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