



Gerald G. Grubisa, Mine Geologist
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 VOL 1P0

Dear Gerald:

Here is some information on the rocks and mineral sample that you sent me.

1. Rocks sample information:

I had thin sections cut of the four rock samples that you sent. None have actinolite, instead they contain a chlorite that has low birefringence (gray to yellow to anomalous brown), are length fast to slow, are slightly pleochroic from greenish to yellowish, and have a variable radiating to prismatic habit; some form stubby laths.

Also noted in the sections were quartz veins with "crackled" grains, epidote (clinozoisite and some zoisite), sericite and carbonate alteration. Sample 1-2 apparently has two generations of plagioclase - one is sericitized, the other is unaltered.

Sample 2-2 has inclusions of the country rock in the veins, and there are alternating fine (sheared) and coarser zones that define a foliation. Carbonate veinlets cut this foliation. Chlorite-epidote clots occur and sericite is strung out in the foliation. Twins in the plagioclase crystals are bent and broken; the finer grained zones (semi-ductile shears) are mostly broken pieces of plagioclase. Other rock forming minerals are quartz and accessory apatite and an opaque mineral.

Sample 1-1 also has quartz and plagioclase. The quartz is deformed, and the plagioclase twinned and partly sericitized. There are local sericite-chlorite intergrowths, quartz +/- epidote veins and zoisite-sericite replacing plagioclase along fractures. This sample is sheared, but not mylonitic.

Sample 2-1 has prismatic chlorite that looks deformed. It is birefringent from yellow-green to olive brown and has sub-parallel extinction. Alteration/vein minerals are quartz, carbonate and chlorite. Chlorite also fills fractures in quartz veins.

2. The "unknown" mineral:

Geologists here who looked at the specimen thought it was specularite, but it is harder than expected and we could not get a red streak. The X-ray work confirmed the sample as specular hematite and an SEM-EDX scan showed high iron and some titanium, that is they concluded it is Ti-hematite, which may account for the odd properties noted.

I hope these notes help. The mineral sample is enclosed. I can also send the rocks back and the thin sections if you wish; please let me know.

I hope this data helps. I was surprised that none of the green mineral was actinolite, especially where it has a radiating habit. Again, thanks for the tour this fall, we really enjoyed it.

Yours sincerely,

W.J. McMillan