















Sample Number : O542 RH15 197.3m  
Identification : Chlorite slate with deformed fissure veins  
of quartz, sphalerite and minor calcite

Description :

The hand specimen is a drill core sample of fresh, greenish black, chloritic rock with a crenulated foliation oriented at about 70° to the core axis and roughly paralleled by stringers of quartz and dark reddish brown sphalerite. Pale grey, crenulated veinlets cut the foliation at high angles.

No K-feldspar at all was revealed by a cobaltinitrite staining test.

In thin section the bulk of the sample is seen to consist of well foliated fine-grained chlorite and quartz, both finer than 0.01 to 0.02mm, and "dusty" streaks of ultra-fine opaque grains.

Several boudinaged veins of strained quartz, sphalerite and very minor carbonate (apparently calcite) lie subparallel to the dominant foliation. The maximum thickness of the veins is about 1mm. Much finer, crenulated quartz veins (0.1mm thick) discordant with the foliation also carry sphalerite and strained quartz. A later, straighter, barren vein of unstrained quartz cuts all structures.

An approximate mode of the sample is :

92-97%	chlorite
3-5%	quartz
0.3-0.5%	opagues
1-3%	vein quartz
trace	vein calcite
0.4-0.6%	vein sphalerite

Comments and Interpretation :

The sample is a chlorite slate, thought to have formed by regional metamorphism of a clay-rich mudstone. One foliation direction dominates, but a second foliation is weakly expressed.

Veins of quartz, sphalerite and very minor calcite were introduced before or during deformation and have been strained, boudinaged and crenulated. The contact characteristics are dominantly those of fissure veins.

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Sample Number : O543 RH15 295.6m  
Identification : Heavily sericitic, regionally metamorphosed  
rhyolitic or rhyodacitic tuff

Description :

The hand specimen is a drill core sample of fresh, speckled dark greenish grey rock with tuffaceous textures, including ovoid lithic clasts 2 to 10mm long oriented at about 75° to the core axis.

When the sample was etched and tested with cobaltinitrite stain, a few wispy, possibly pumiceous clasts were revealed and K-feldspar was detected as abundant phenoclasts or phenocrysts, about 1mm in size, and as abundant fine grains. A thin hematitic stringer was noticed.

In thin section the sample is seen to display abundant fine recrystallization and conversion to sericite and chlorite, but there are many remnant textures consistent with a former tuff. Lithic fragments, phenocrysts, phenoclasts and former pumice are recognizable. Residual phenoclasts include quartz, orthoclase and plagioclase, all partly recrystallized and the plagioclase commonly "webbed" with sericite. Most of the rock now consists of quartz, untwinned feldspar, sericite and chlorite. Variations in relative abundances define the lithic clasts and subtle hematitic pigmentation reveals some of the pumice. Much of the sericite is web-like, being oriented within two foliation directions.

Subhedral magnetite, 0.2mm in grainsize is disseminated through the rock in a fashion suggesting late formation. No pyrite was seen in thin section but a replacement zone of pyrite is visible in the off-cut near a hematitic stringer.

An approximate mode of the sample is :

30-40%	quartz
15-25%	orthoclase
2-5%	plagioclase
5-10%	chlorite
40-50%	sericite
0.5-0.8%	magnetite
trace	hematite
rare	pyrite

Comments and Interpretation :

The sample is confidently interpreted as having originated as a rhyolitic to rhyodacitic tuff, composed of phenoclasts, pumice and small lithic fragments. It has since been deformed and has experienced heavy sericitic alteration, but not to the extent that all feldspars are destroyed.

The disseminated magnetite, apparently crystallized as a late subhedral phase in the rock may be an alteration feature.

Sample Number : 0544 RH15 317.0m

Identification : Chloritic, regionally metamorphosed,  
rhyolitic or rhyodacitic, lithic tuff  
or agglomerate

Description :

The hand specimen is a drill core sample of fresh rock, coarsely mottled into regimes which are dark greyish green and pale red or greyish red. The reddish mottles vaguely resemble lithic clasts about 10 to 30mm in size with long axes oriented at 75° to the core axis.

A staining test revealed that the reddish mottles are rich in fine K-feldspar and the green, chloritic regimes are devoid of K-feldspar except as partial replacements of 1 to 2mm phenocrysts or phenoclasts.

In thin section the reddish regimes are seen to consist of sparse phenocrysts of quartz (0.5mm in size) and feldspar (1 to 2mm in size) set in a weakly foliated, metamorphically recrystallized groundmass of quartz, untwinned feldspar, chlorite and colourless carbonate with euhedral forms suggestive of dolomite. The red pigmentation is attributable to extremely fine hematite, present in low abundance. The feldspar phenocrysts include plagioclase and orthoclase and are partly recrystallized and weakly sericitized. One hematitic area has a wispy, pumiceous appearance.

The green regimes consist mainly of quartz, chlorite and sericite. The quartz has a grain size of about 0.03mm, the chlorite occurs as aggregates of extremely fine grains and the sericite occurs as flakes oriented to produce two strongly preferred attitudes intersecting at about 70°. The result is a fine web-like appearance at low magnification.

Magnetite, chlorite, tourmaline and very fine brown biotite occur in aggregates about 0.5mm in size, replacing some former subhedral rhombic mineral, perhaps siderite or dolomite. There is one atypical, nodular aggregate in which magnetite has partly replaced siderite. Only minor magnetite occurs within the red regimes but it is associated with similar shapes and associated minerals to those seen in the green regimes.

A few partly recrystallized phenoclasts of quartz and feldspar occur in the green regimes. Boundaries between the red and green regimes are somewhat blurred.

An approximate mode of the sample is :

30-50%	quartz
30-35%	orthoclase
10-20%	plagioclase
10-15%	chlorite
2-3%	sericite
0.4-0.6%	magnetite
0.1-0.2%	hematite
0.1-0.2%	dolomite
<0.1%	siderite
0.1-0.2%	biotite
0.1-0.2%	tourmaline

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Comments and Interpretation :

The sample is confidently interpreted as having originated as a coarse, acid lithic tuff, perhaps even agglomerate. The matrix between the rhyolitic or rhyodacitic lithic clasts was probably muddy.

Subsequent modification of textures and mineralogy has been dominated by changes compatible with greenschist facies metamorphism and involving at least two cycles of deformation. If there are hydrothermal effects of any note, they may relate to production of dolomite and siderite then conversion to magnetite.