600148

THE GALORE CREEK PROPERTY

Geology 409

A Mineralography report
done by:

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Poorly presented.

The Galore Creek Property

Introduction:

The Galore Creek property of Kennco Explorations is part of a large occurence of highly disseminated copper mineralization first discovered in 1956 by Hudson's Bay Explorations. The property lies about twenty miles southwest of the junction of the Scud and Stikine rivers, sixty miles downstream from Telegraph Creek on the Stikine.

The mineralization occurs in extensive zones in syenite and tracyte porphyry, shattered volcanics, sediments and dykes. Exploration on the property to date includes trenching, mapping, geophysical and geochemical work and diamond drilling, which is continuing.

Megascopic Examination of Specimens:

The hand specimens supplied represented mineral occurrences over a wide area. Most of the specimens were from surface trenches and exhibited varying amounts of iron stain, malachite stain, and general weathering.

Minerals:

The major sulfides recognized in hand specimens were pyrite, bornite, chalcopyrite, galena, and chalcocite. Chalcopyrite, bornite and pyrite were seen in nearly every specimen viewed with the binocular microscope. Galena and chalcocite were only seen in isolated cases and in smaller quantity. The magnetic properties of some of the specimens indicated the presence of either pyrrhotite or magnetite. The sulfide minerals present were fine grained and highly disseminated.

Host Rocks:

The host rocks were not easily identifiable in most cases. There were several types recognized. The major types were a silicified limy type, a biotite lamphrophyre, altered volcanics, and altered porphyry with feldspar phenocrysts. The lamphrophyre contained a xenolith of what appeared to be acidic igneous rock. The major alteration was silicification.

A tabulated description of the hand specimens is given in Table 1.

Microscopic Examination:

Minerals:

The major metallic minerals found appear to belong to several periods of mineralization. The primary copper minerals (sulfides) appear to belong to one and possibly two periods of mineralization.

Chalcopyrite occured as finely disseminated grains 1 micron to 1 millimeter in size. Chalcopyrite occurred as discrete grains, as exsolution blebs in chalcocite, exsolved along grain boundaries in bornite, as residuals in a magnetite-hematite matrix, associated with pyrite and as residuals with bornite in tennantite.

Bornite occurred associated with chalcopyrite in most cases. Exsolved chalcopyrite appeared to be a characteristic of the bornite present. In a few specimens bornite was in an early alteration stage. Geothite, covellite and malachite were the associated alteration products. In one instance the bornite was in an advanced stage of altering to covellite while the associated chalcopyrite appeared fresh. The bornite grain size varied from 1 micron to 1 millimeter.

The pyrite present appeared in most cases as euhedral and anhedral crystals. Many of the pyrite crystals were fractured and partially replaced by later quartz and chalcopyrite. Pyrite residuals were also noted in chalcocite. Somewhat anomalously some pyrite grains appeared to contain residuals of chalcopyrite.

Magnetite and hematite appeared together in veinlets and grains. Anhedral crystals of magnetite were common in one section. Hematite also appeared alone, in veinlets and associated with chalcopyrite. In one instance a residual of chalcopyrite containing exsolved bornite was found in a grain of magnetite. Residuals of chalcopyrite were common to the magnetite and hematite present.

Chalcocite appeared in only a few sections. In the section from DDH-19 chalcocite occurred in large grains with an abundance of exsolved chalcopyrite, residuals of pyrite and some later galena.

Galena, tetrahedrite and tennantite appeared in minor quantity. Tennantite occurred as large grains in one case with included grains of chalcopyrite, bornite and galena. The tennantite appeared greenish grey and isotropic in section. Galena was present in minor quantity in several of the sections examined. In one case galena was seen to transect a grain of chalcocite. The largest occurrence of galena was in section 40. In this section one small grain of tetrahedrite was found associated with a large grain of galena. The tetrahedrite appeared brownish-grey contrasted with the white galena.

Secondary covellite, limonite and malachite appeared associated with altered bornite in two sections. The covellite was identified by colour and strong anisotropism.

Gangue:

Two types of post-mineral gangue were present. The earlier was a brown carbonate occurring as euhedral grains. The later was a quartz gangue which occurred in veinlets, sometimes including small grains of chalcopyrite. Both gangue types replaced the major minerals in part.

Optical data and Etch Tests:

The optical data and etch tests for the minerals met for the first time are given in the appendix.

Table 1

Megascopic properties of hand Specimens

Specimen	Mineralization	Origin	Appearance	Host Rock
5	dissem. Cp,Bn	trench	Mal. stain vuggy	Altered volcanic
20	none visible	trench	Mal. stain fine grained	silicified Lmst.
GC3	dissem. Bn,(Cp?)	trench	altered rock---flds.crystal	Acid porphyry
34	dissem. Cp and ?	float or trench	Limonite stain, fractured Cp in fractures	siliceous
26	dissem. Cp in ? magnetic mineral	float	heavily mineralized	?
3	dissem. Cp	trench	dark vuggy rock	volcanic
GC1	none visible	trench	dark micaceous rock granitic xenolith--dyke	Biotite Lamph.
28	dissem. Cp	trench?	Mal. stain--dark vuggy altered rock	volcanic
46	dissem. Cp& others	trench	vuggy altered rock	volcanic
22	dissem. Cp	trench	altered rock	?
12	dissem. Cp,Cc?,mal.	trench	altered rock--minerals in fractures	?
43	dissem. Bn,Cp	trench	highly altered	?
7	dissem. Cp,Cc?	trench	fractured rock	granitic
40	dissem. Gal.,Cp,Py	trench	azurite stain on altered rock	Felds. porph.
36	dissem. Cp,Py	trench	shattered--limonite in cracks--vuggy	siliceous
35	dissem. Cp,Bn	trench	shattered	feldspar rich
DDH39	dissem. Cp,Bn magnetic	drill hole	massive mineralization	?
DDH19	dissem. Cp,Bn?,Py Gal.,Cc	drill hole	Carbonates & quartz gangue	?

Sec 5

Pyrite replacing chalcopyrite? Pyrite replaced by later quartz gangue.

Not conclusive!

5

did you watch it?

Chalcopyrite being replaced by hematite. Note hematite lathes with cores of chalcopyrite.

20

Bornite with exsolution chalcopyrite altering to covellite. +475°C (Xenothermal)

GC-3

Bornite with incipient alteration to covellite along cleavage directions.

46

Bornite being leached to give limonite and supergene malachite. (outcrop alteration)

Scale?

26

Pyrite being replaced by chalcopyrite and magnetite.

26

pyrite
Chalco~~cite~~ being replaced by anhedral magnetite crystal containing hematite and chalcopyrite residuals.

DDH-39

Magnetite with chalcopyrite residual containing exsolved bornite?

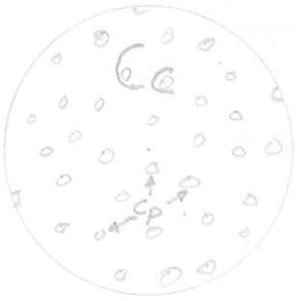
DDH-19

Chalcocite with exsolved chalcopyrite, pyrite residuals, later galena and hematite.

DDH-19

Chalcocite being replaced by galena.

DDH-19



Chalcocite with exsolved chalcopyrite.

DDH -39

Bornite being replaced by ~~chalcopyrite~~ anhedral magnetite.

5

Pyrite being replaced by chalcopyrite and quartz gangue.

5

Pyrite being replaced by chalcopyrite and quartz gangue.

12

Tennantite with residual chalcopyrite, bornite with exsolved chalcopyrite, and contemporaneous galena.

Primary Minerals:	Amount:
Chalcopyrite	1 to 3%
Bornite	0 to 3%
Magnetite	0 to 2%
Pyrite	1%
Hematite	0 to-1%
Chalcocite	0 to 1%
Galena	trace
Tennantite	trace
Tetrahedrite	trace

Alteration Minerals:	
Malachite	trace
Covellite	"
Limonite	"
Digenite	"

Textures:

The significant and conflicting textures can be seen on the opposite pages.

Paragenetic Sequence:

Due to the wide area over which these specimens were taken it was found difficult to obtain a clear paragenetic sequence. Not all the textures examined pointed conclusively to a definite sequence. A general and most probable(simplest) sequence is given below.

Pyrite ———
Chalcopyrite-Bornite-Chalcocite ———
Magnetite-Hematite ———
Galena-Tennantite-Tetrahedrite ———

A more complex possibility is:

Chalcopyrite-Bornite ———
Pyrite ———
Magnetite-Hematite with Chalcopyrite ———
Chalcocite —
Galena-Tennantite-Tetrahedrite with carbonate gangue ———
Secondary minerals and quartz gangue —

Type of Deposit:

The specimens from this deposit have relatively simple mineralogy. Many of the features such as a high degree of dissemination, the presence of porphyry, and salt and pepper texture in one altered specimen point toward a porphyry type deposit. Not enough is known of the petrology and general geology to form a firm conclusion. The mineralization is characteristic of a mesothermal replacement deposit. Some xenothermal characteristics.

MINERALOGRAPHIC LABORATORY

Date March 1963

Name or number of section . . 12. . . . . .

Polish good

Colour grey-white (greenish tinge)

Hardness ~ C+

Streak –

Texture massive

Pleochroism – nil

Anisotropism – nil

Texture under xd, nicola – massive

Twinning – nil

Internal reflection – nil

Cleavage – nil

Association – cp, Bn, Gal.

Etch tests

$HgCl_2$ neg

KOH neg

KCN neg

HCl neg

$FeCl_3$ neg

HNO_3 pos.

Aqua regia

Microchemical tests Cu(+ve), As(+ve)

Grain size large

Confirmatory features such as magnetism, sectility, fluorescence, blowpiping, radioactivity, etc.

. . . . . .

Mineral or Group Tennantite

Interpretation of textures. Primary - later mineral galena contemporaneous

MINERALOGRAPHIC LABORATORY

Date March 1963

Name or number of section . . DDH-19 . . . . . .

Polish good

Colour blue-grey

Hardness extremely hard

Streak —

Texture massive veinlets

Pleochroism — nil

Anisotropism — nil

Texture under xd, nicola — massive

Twinning —

Internal reflection — nil

Cleavage nil

Association — cp, Bn exsolved in chalco

Etch tests

$HgCl_2$ neg

KOH neg

KCN neg

HCl neg

$FeCl_3$ neg

HNO_3 neg

Aqua regia — no reaction

Microchemical tests

Grain size large

Confirmatory features such as magnetism, sectility, fluorescence, blowpiping, radioactivity, etc. magnetic powder

. . . . . .

Mineral or Group Magnetite

Interpretation of textures. — primary

MINERALOGRAPHIC LABORATORY

Date March 1963

Name or number of section . . . 34 . . . . . .

Polish good

Colour grey

Hardness needle will not scratch

Streak – red-brown powder

Texture interlocking grains in veinlets

Pleochroism moderate

Anisotropism strong – grey-brown

Texture under xd, nicola same

Twinning polysynthetic

Internal reflection nil

Cleavage ?

Association Cp

Etch tests

$HgCl_2$ neg.

KOH neg.

KCN neg.

HCl neg.

$FeCl_3$ neg.

HNO_3 neg.

Aqua regia neg.

Microchemical tests Fe (+ve) . Mn (neg), Sb (neg.), Cu (+ve), Zn (violet crosses) Zn (neg. on second trial)

Grain size large

Confirmatory features such as magnetism, sectility, fluorescence, blowpiping, radioactivity, etc. non-magnetic

. . . . . .

Mineral or Group Hematite

Interpretation of textures. primary replacing chalcopyrite

MINERALOGRAPHIC LABORATORY

Date March 1963

Name or number of section . . 40 . . . . . .

Polish Good

Colour Brown-grey (contrasted with Galena)

Hardness C+

Streak –

Texture - single grain

Pleochroism nil

Anisotropism nil

Texture under xd, nicola –

Twinning - nil

Internal reflection - nil

Cleavage - nil

Association galena, cp., Py

Etch tests

$HgCl_2$ neg

KOH neg

KCN neg

HCl neg

$FeCl_3$ neg

HNO_3 doubtful

Aqua regia

Microchemical tests (too small)

Grain size < 10μ

Confirmatory features such as magnetism, sectility, fluorescence, blowpiping, radioactivity, etc.

. . . . . .

Mineral or Group Tetrahedrite

Interpretation of textures. - primary with galena