MINERALOGRAPHIC REPORT

WESTERN URANIUM COBALT MINES

APRIL 2, 1966

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MACROSCOPIC EXAMINATION

The hand specimen studied for this report was composed of a dark grey amphibole-rich material bordered on one side by pinkish granitic rock. The dimensions of the specimen were 1½" by 1¾" by 3"; it was cut on four sides, one of which was polished and later examined microscopically.

Molybdenite was the only metallic mineral recognizable without the use of magnification. It occurred in the amphibole-rich portion as rounded clusters and irregularly shaped segregations, ranging in diameter from about 1mm. to 5mm. and comprising about 2% of the total material. In the granitic rock though, the molybdenite occurred only as tiny, widely disseminated grains and segregations, barely recognizable without the hand lens, and present in amounts of less than .5%.

The hand specimen was found to receive a strong response from the geiger counter. Further examination of the polished surfaces with the binocular microscope revealed randomly distributed, minute grains (<.5mm.) of uraninite; arsenopyrite was also recognized.

MICROSCOPIC EXAMINATION

Two polished surfaces and a thin section were examined microscopically.

An examination of the thin section with the polarizing microscope showed that the amphibole-rich portion contained,

: ~ 40% amphibole: hornblende, and probably actinolite, partially altered to chlorite
: ~ 30% sericitized plagioclase
: ~ 20% quartz, in large anhedral interlocking grains
: ~ 3% apatite, as euhedral prismatic crystals.

Identified also were sphene, carbonate (calcite, and possibly siderite) and molybdenite. An equant polyhedral opague was probably uraninite. The major constituents were medium grain. size of

The textures indicate that hornblende and then plagioclase were first formed, followed by quartz and apatite. The metals appear to have been deposited during the later stage, while chlorite, sericite, and carbonate were probably formed at a still later period.

THE POLISHED SECTIONS

THE MINERALS

Molybdenite
: Polish; good
: Colour: white to light grey
: Hardness; very soft
: Texture; foliate, plates often curved and rumpled; plates sometimes have no apparent orientation; plates often have a radiating habit, and are arranged around portions of gangue, forming rim textures and concentric zonal textures.
; appears to corrode uraninite crystals.

: Anisotrophism; strong with pale violet colours
: Cleavage; platy
: Association; usually in quartz gangue, in the vicinity of uraninite grains but not often in contact with uraninite.
: Etch tests; negative to all reagents
: Microchem tests; Mo (+) strong
: Grain size; most individual segregations have diameters of 750-1500 microns, but these may be united, forming larger clusters. The segregations are composed of platey crystals having an average length of 250 microns .

Uraninite

: Polish; poor
: Colour; grey
: Hardness; very hard
: Texture; scattered rounded grains and euhedral crystals, having 4 - 6 well defined sides
: Anisotropism; isotropic
: Association; rarely in contact with any metallic minerals, but often occurs in the vicinity of molybdenite concentrations.
: Etch tests; negative to all reagents
: Microchem tests; Fe (-)
: Grain size; The average is about 160 microns; the rounded grains tend to be smaller while the crystals are usually larger

Arseno Pyrite

: Poor polish, very hard
: White colour
: Texture; mainly corroded crystals, rhombic outlines may be still evident.
: Anisotrophism; strong, with yellow and blue colours
: Microchem; (-) Ni
(-) Co
(+) Fe
: Grain size; average 75-150 microns, rarely > 200 microns

Hematite?

: Polish; good
: Colour; Grey
: Hardness; very hard
: Streak; difficult to determine due to fine grain size
: Texture; minute irregularly shaped blebs
: Anisotropism; distinct but not always seen
: Association; confined to a light brown translucent mineral
: Etch tests; negative to all reagents
: Microchem test; Ti (-)
Fe (+) but weak
: Grain size; most blebs are < 150 microns in diameter

MINERAL PERCENTAGES

The percentages among the metallic constituents were estimated to be as follows:

Molybdenite	65%
Uraninite	20%
Arsenopyrite	10-15%
Hematite?	2%

and, the total metallic constituent was low, about 3%.

DISCUSSION OF TEXTURES AND PARAGENESIS:

The metallic minerals are rarely in contact, and so, the relationship between them was difficult to ascertain. The few contacts between molybdenite and uraninite do suggest though, that the molybdenite had partially replaced uraninite. In addition, corroded crystals of arsenopyrite and uraninite in gangue indicate that these minerals were deposited during the formation of the gangue. Likewise, some of the radiating textures of molybdenite suggest that it had grown, more or less freely around certain grains of quartz and feldspar during the active deposition of quartz.

It is proposed here that the metallic minerals were deposited during the later more siliceous stage of gangue formation and that the order of deposition was,

arsenopyrite
uraninite
molybdenite.

TYPE OF DEPOSIT

The mineralogy, both metallic and nonmetallic indicates a high temperature of formation. The association of the major metallic minerals with quartz, lends some support to the notion of a hydrothermal origin, and the deposit could be classed as hypothermal.

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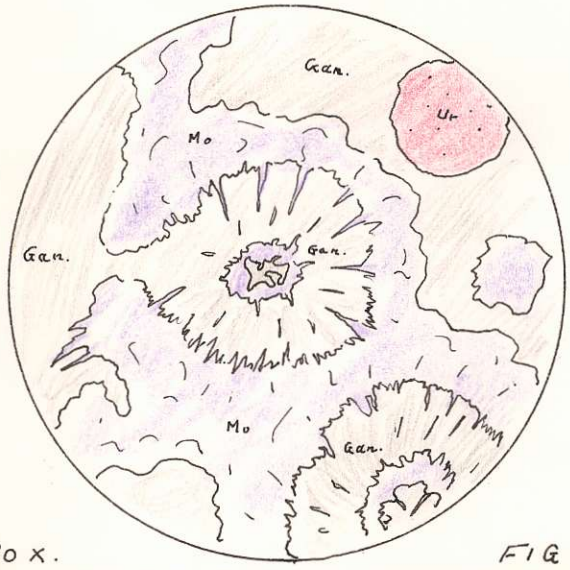
RMT
April 13/66

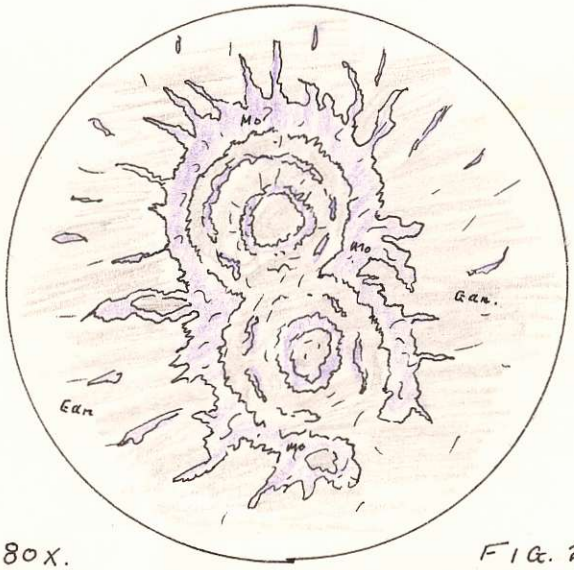
TEXTURES



Mo ... MOLYBDENITE
Ur. ... URANINITE
Gan. ... GANGUE

80 X. FIG 1.

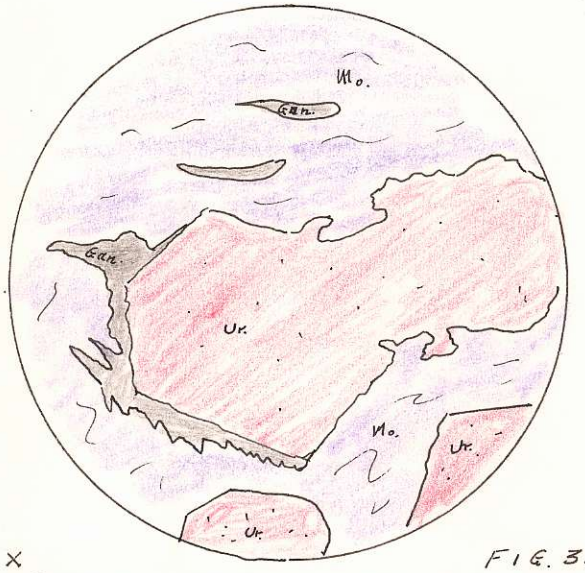
: THE PARTIAL REPLACEMENT OF GANGUE BY MOLYBDENITE, AND THE DEPOSITION OF MOLYBDENITE AROUND AREAS OF REPLACEMENT.
: TYPICAL ROUNDED FORM OF URANINITE.



Mo. ... MOLYBDENITE
Gan. ... GANGUE

80X. FIG. 2

: CONCENTRIC ZONES OF MOLYBDENITE IN GANGUE, POSSIBLY DUE TO DIFFUSION - PENETRATION OF MOLYBDENITE FROM THE GRAIN BOUNDARIES OF THE GANGUE HOST.
: COMMON RADIATING HABIT OF MOLYBDENITE IN THE PERIPHERY OF THE "CLUSTERS"

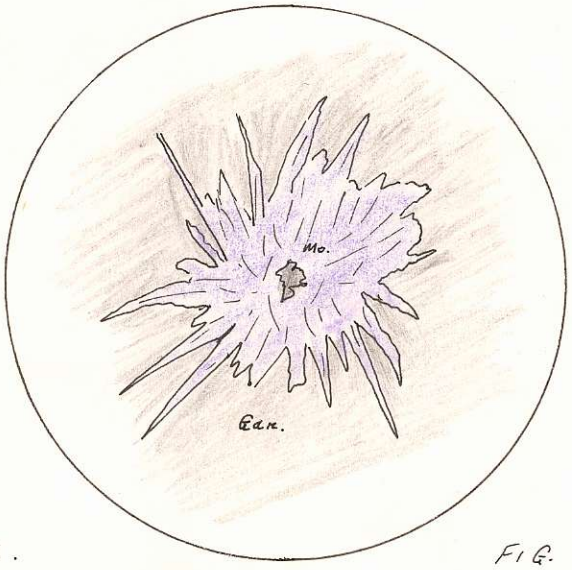


Mo. . . . MOLYBDENITE
Ur. . . URANINITE
GAN. . . . GANGUE

320 X

FIG. 3.

PARTIAL REPLACEMENT OF EUHEDRAL URANINITE BY MOLYBDENITE.



Mo . . . MOLYBDENITE
Gan. . . . GANGUE

80 X.

FIG. 4

MOLYBDENITE "CLUSTER" SHOWING COMMON SUB-RADIAL DEVELOPMENT.