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A MINERALOGICAL INVESTIGATION OF A MOLYBDENUM ORE FROM THE ALICE ARM AREA, B. C., FOR WRIGHT ENGINEERS LIMITED

by

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MINERAL SCIENCES DIVISION

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SUMMARY OF RESULTS

A sample of a molybdenum ore from the Alice Arm area in British Columbia and three molybdenite concentrates prepared from this ore were studied mineralogically. The principal metallic minerals are molybdenite and pyrite, and the principal non-metallic mineral is quartz. The molybdenite is intergrown with quartz and pyrite, and molybdenite concentrates prepared from this ore contain some quartz and trace amounts of pyrite.

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INTRODUCTION

Samples of a molybdenum ore from the Alice Arm area in British Columbia were received from T.F. Berry of the Mineral Processing Division. Mr. Berry stated that the ore was submitted to the Mines Branch by Wright Engineers Limited, 1103 West Pender Street, Vancouver 1, B.C., on behalf of Kennco Explorations Limited, and he requested that the samples be studied mineralogically.

SAMPLES

The following samples were received from Mr. Berry.

(1) About 1 pound of broken drill core labelled "Reference No. 377";

(2) A molybdenite concentrate containing 64.8% MoS_2*;

(3) A molybdenite concentrate containing 85.0% MoS_2*;

(4) A molybdenite concentrate containing 92.0% MoS_2*.

METHOD OF INVESTIGATION

Three polished sections and two thin sections were prepared from the drill core (Sample 1), and the minerals were identified by means of microscopical and X-ray diffraction studies. Two of the molybdenite concentrates (Samples 2 and 3) were separated into fractions by means of heavy liquids (specific gravity = 2.96) and the resulting fractions, as well as the other molybdenite concentrate (Sample 4), were examined under the petrographic and ore microscopes.

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*Analysed by the staff of the Analytical Chemistry Subdivision, Mineral Sciences Division, Mines Branch.

RESULTS OF INVESTIGATION

Mineralogy of Drill Core

The metallic minerals present in the drill core are molybdenite, pyrite and traces of chalcopyrite, sphalerite, pyrrhotite and magnetite. The non-metallic minerals are quartz, calcite, rutile, chlorite and traces of sericite and garnet.

The molybdenite is present as aggregates of grains (see Figure 1), and as individual crystals disseminated in the gangue (see Figure 2). The molybdenite grains are relatively small and are intimately intergrown with pyrite and quartz.

The pyrite, chalcopyrite, sphalerite and magnetite are present as individual grains in the gangue. The pyrite is more abundant than chalcopyrite, sphalerite and magnetite, and some of the large pyrite grains contain minute inclusions of pyrrhotite.

A number of masses composed of rutile and quartz are present in the rock (see Figure 2). These masses have a distinct outline which suggests that the rutile-quartz mixtures are pseudomorphs, after a pre-existing mineral.

Mineralogy of the Molybdenite Concentrates

The molybdenite concentrates containing 64.8% and 85% MoS_2 (Samples 2 and 3) were separated into float, middling and sink fractions. The percentage of each fraction is given in Table 1.

TABLE 1

Results of a Heavy Liquid Separation (sp. gr. = 2.96) of Molybdenite Concentrates

Fraction	Sample 2 Wt. %	Sample 3 Wt. %
2.96 float	9.99	2.36
middling	5.35	4.24
2.96 sink	84.66	93.40
Total	100.00	100.00

The float fractions were deslimed and examined in oil under the petrographic microscope. The examinations show that they consist of quartz and a trace of chlorite, and that the quartz contains inclusions of metallic minerals (see Figures 3 and 4). Polished sections show that the inclusions are molybdenite and a trace of pyrite.

The molybdenite concentrate containing 92% MoS_2 (Sample 4) was also examined in oil under the petrographic microscope. This examination showed that the concentrate contains a few quartz grains (see Figure 5).

CONCLUSIONS

The molybdenite in this ore is intergrown with quartz and pyrite, and studies of the mill products show that quartz and trace amounts of pyrite are present in the molybdenite concentrates.

Figure 1. Photomicrograph of a polished section showing an aggregate of molybdenite grains. It also shows a few small molybdenite grains intergrown with pyrite (white) and quartz (black).

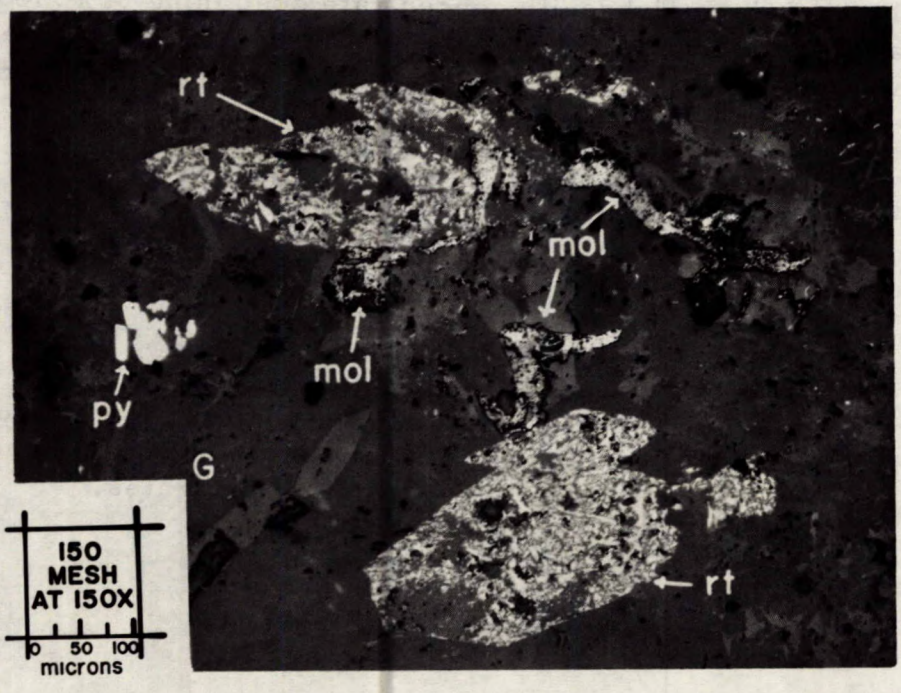

Figure 2. Photomicrograph of a polished section showing three molybdenite flakes (mol) in quartz (G), the rutile (rt)-quartz masses, and a few pyrite grains (py).

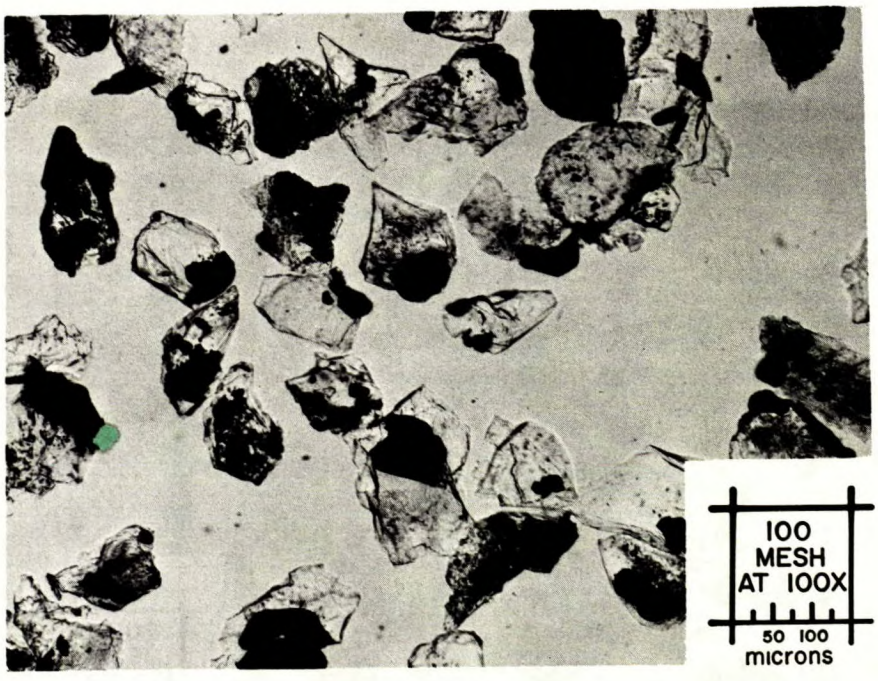

Figure 3. Photomicrograph of an oil immersion mount of the 2.96 float fraction from Sample 2. It shows quartz grains (white) and chlorite grains (diffuse grey areas) containing inclusions of metallic minerals (black).

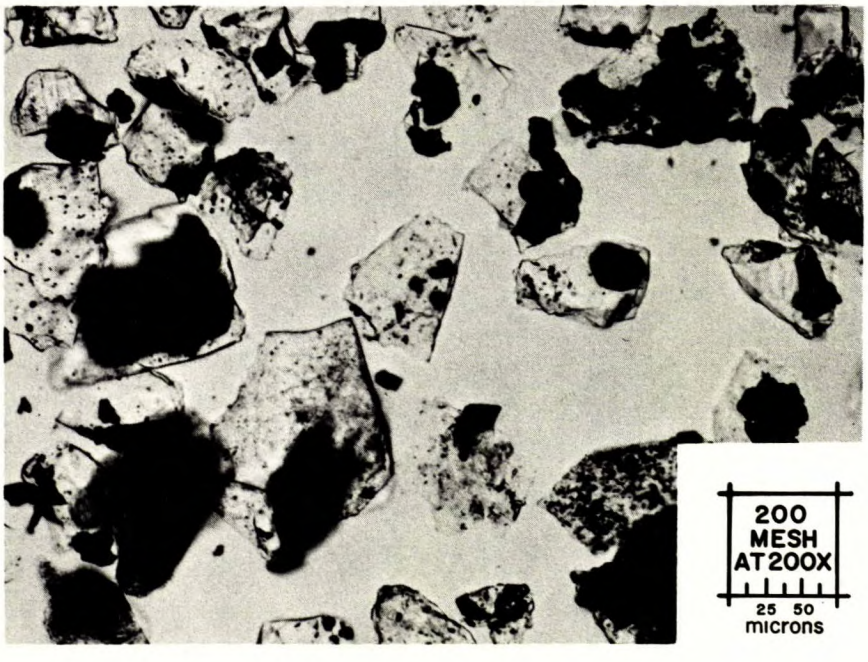

Figure 4. Photomicrograph of an oil immersion mount of the 2.96 float fraction of Sample 3. It shows quartz grains (white) and chlorite grains (diffuse grey areas) containing inclusions of metallic minerals (black).

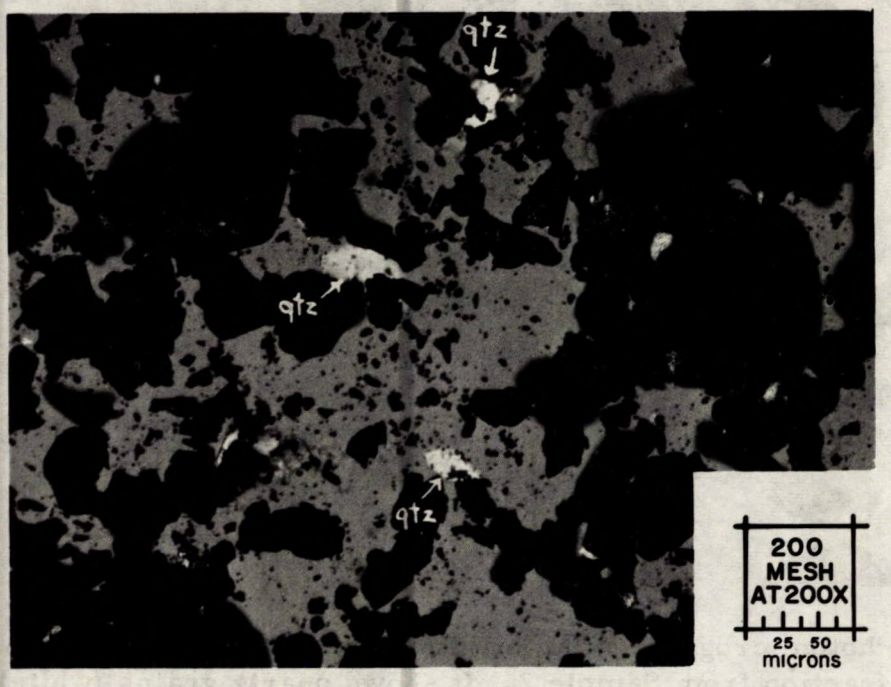

Figure 5. Photomicrograph of an oil immersion mount of the molybdenite concentrate containing 92.4% MoS_2 (Sample 4). It shows the molybdenite (black) and a few quartz grains (qtz).

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