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MINERALOGICAL INVESTIGATION OF A COPPER ORE FROM THE HOPE AREA, B. C. FOR CANAM COPPER COMPANY LIMITED

by

W. PETRUK

MINERAL SCIENCES DIVISION

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SUMMARY OF RESULTS

A mineralogical investigation of the ore has shown that it consists of massive and disseminated sulphides in gangue. It contains a wide variety of ore minerals of which chalcopyrite appears to be the one of chief economic significance.

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* Senior Scientific Officer, Mineralogy Section, Mineral Sciences Division, Mines Branch, Department of Mines and Technical Surveys, Ottawa, Canada.

INTRODUCTION

A sample of a copper ore from the Hope area, British Columbia, was received from A. Stemerowicz of the Mineral Processing Division on October 13, 1965. Mr. Stemerowicz stated that the sample had been submitted to the Mines Branch by Mr. L. P. Starck, General Manager, Giant Mascot Mines Ltd., 1825-355 Burrard St., Vancouver 1, B.C. and requested that it be studied mineralogically. The sample received consisted of diamond drill core crushed to $\frac{1}{4}$ inch.

METHOD OF INVESTIGATION

Five polished sections were prepared from the sample and the minerals were identified by microscopical and X-ray diffraction studies.

RESULTS OF INVESTIGATION

The sample consists of masses and disseminations of ore minerals in gangue. Chalcopyrite, pyrrhotite, pyrite and arsenopyrite are the principal ore minerals, although a variety of others are also present in minor amounts. These include sphalerite, galena, magnetite, ilmenite, rutile, chromite (?). marcasite, native silver, native gold, native bismuth, bismuthinite, pentlandite, molybdenite, cassiterite, sphene and siderite. The gangue minerals are feldspar, amphibole, chlorite, quartz, calcite and dolomite.

Chalcopyrite is the only mineral of economic siginificance that is present in large quantities. It occurs as masses, disseminations in gangue (Figure 1) and pyrrhotite, and veinlets in pyrite. The masses generally occur adjacent to pyrrhotite and pyrite (Figure 2), and contain inclusions of pyrrhotite, sphalerite, magnetite and native gold. Some of the sphalerite inclusions are feather-shaped, while others are irregular; they range up to 150 microns in size. Only one grain of native gold, 2 microns in size, was found.

Pyrrhotite, pyrite and arsenopyrite are the only major ore minerals, and they occur largely as masses and disseminations in gangue. The pyrrhotite masses contain irregular inclusions of chalcopyrite, sphalerite, magnetite and galena, and flame-like bodies of pentlandite. The pyrite masses contain inclusions of gangue and veinlets of chalcopyrite. The arsenopyrite

masses contain prismatic crystals and irregular grains of rutile, ilmenite, rutile-ilmenite intergrowths, native bismuth, bismuthinite and molybdenite (Figures 3 and 4). The native bismuth grains are up to 50 microns in size.

A small amount of magnetite is also present. It occurs as small masses and euhedral and subhedral grains in gangue, chalcopyrite and pyrrhotite (Figure 5). Some of the grains are bordered by a mineral whose optical properties are similar to those of chromite, while others are bordered by gangue. A minute inclusion of native silver was found in the magnetite.

The remaining ore minerals, as well as some of the minor ones referred to above, are present as small disseminated grains in gangue. These are rutile, cassiterite, molybdenite, galena, marcasite, sphene and siderite. Their maximum size is of the order of 100 microns. The distribution of molybdenite in one area is shown in Figure 6.

CONCLUSIONS

A wide variety of minerals is present in the ore; those of interest from an economic standpoint are: chalcopyrite, galena, molybdenite, native silver, native gold, native bismuth and bismuthinite. Only the chalcopyrite is present in substantial quantities and it is the only ore mineral that is relatively coarse grained. The chalcopyrite would appear to be relatively easy to liberate; the other ore minerals would be more difficult.

The native silver and gold were found only in magnetite and chalcopyrite respectively, but is possible that they occur in other minerals as well.

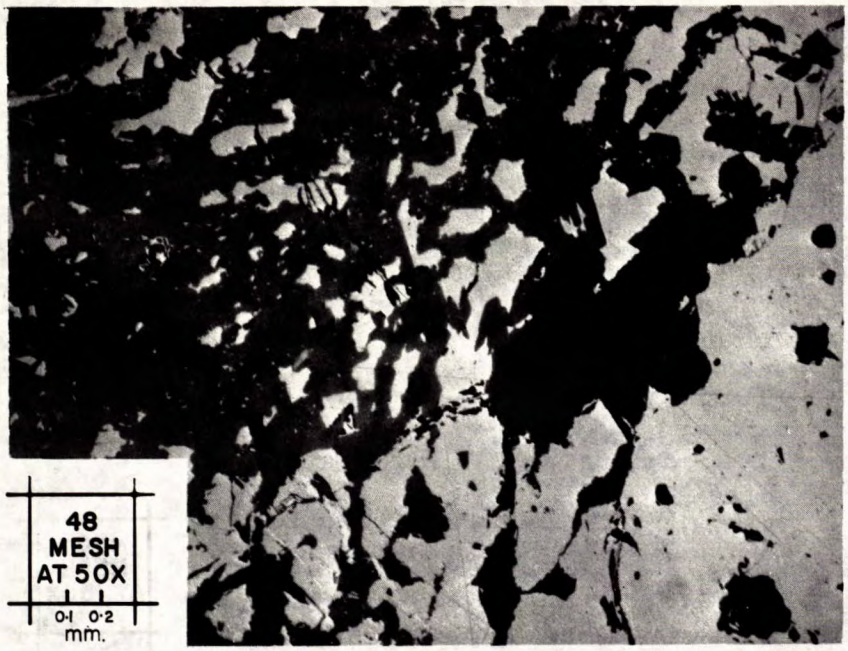

Figure 1 Photomicrograph of a polished section showing massive and disseminated chalcopyrite (white) in gangue (dark grey).

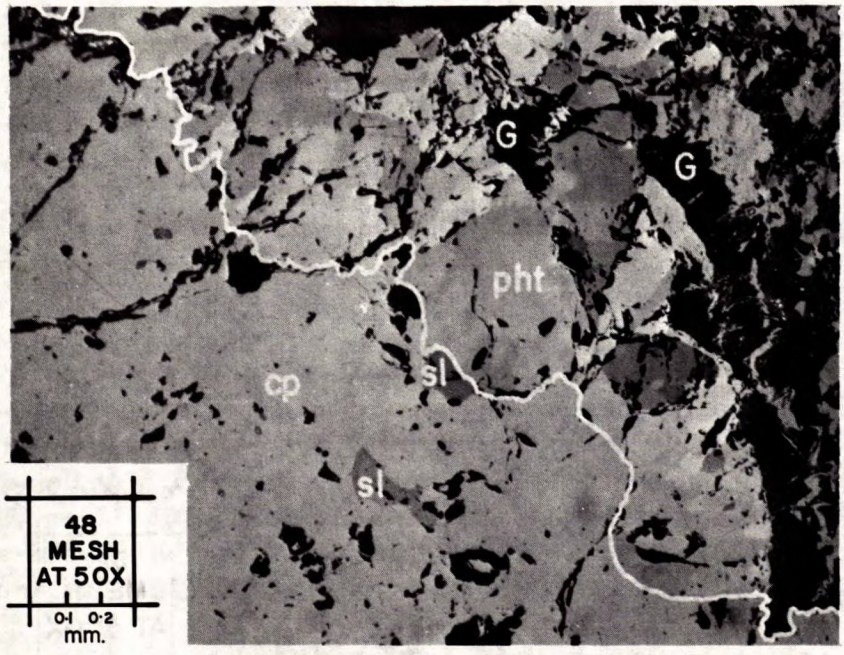

Figure 2 Photomicrograph of a polished section of massive sulphides under partially crossed nicols. It shows chalcopyrite (cp), pyrrhotite (pht), sphalerite (sl) and gangue (G). A white line has been drawn along the chalcopyrite-pyrrhotite boundary to delineate it.

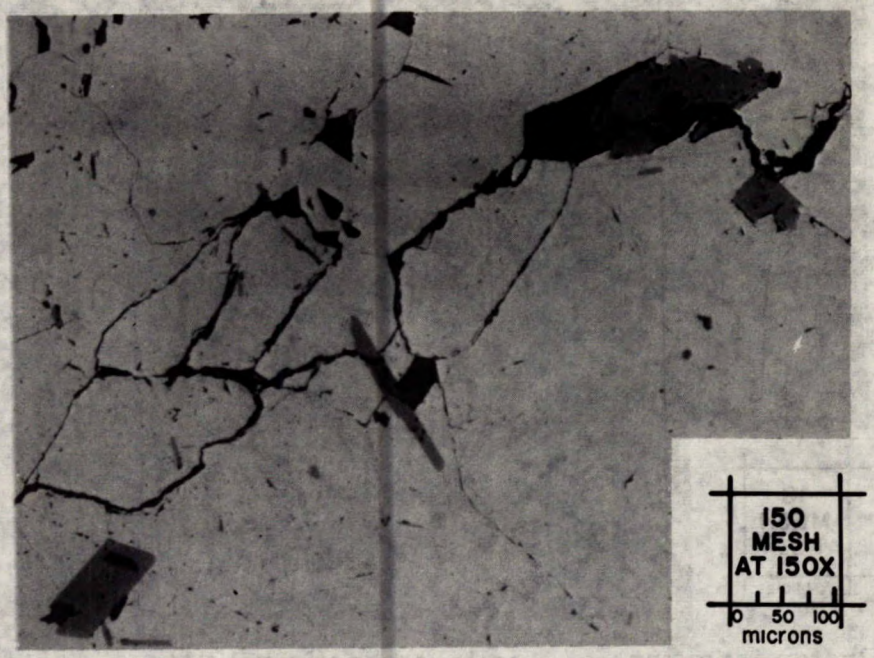

Figure 3 Photomicrograph of a polished section showing prismatic crystals of ilmenite (light grey) and rutile (dark grey) in arsenopyrite (white).

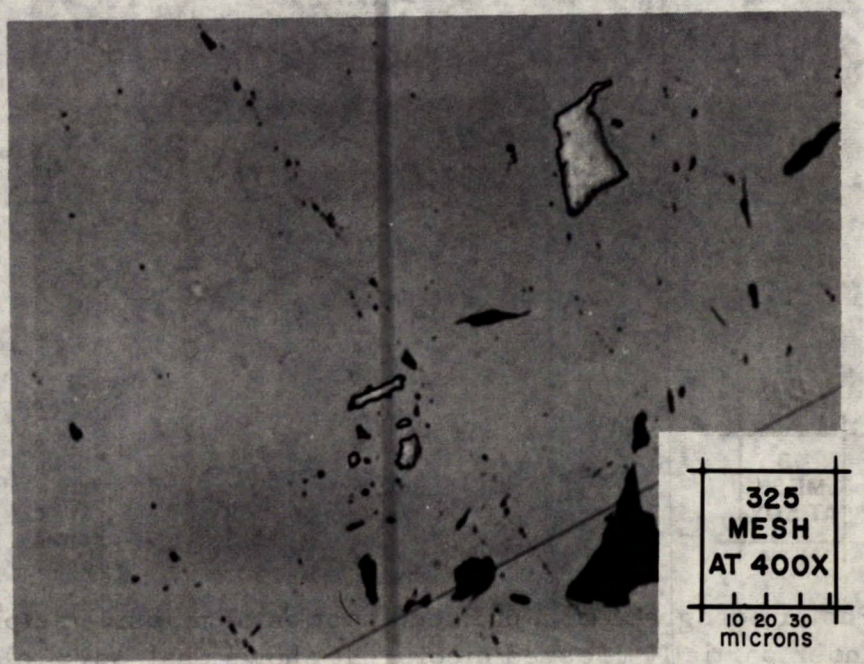

Figure 4 Photomicrograph of a polished section showing inclusions of native bismuth in arsenopyrite. The black areas represent pits in the polished section.

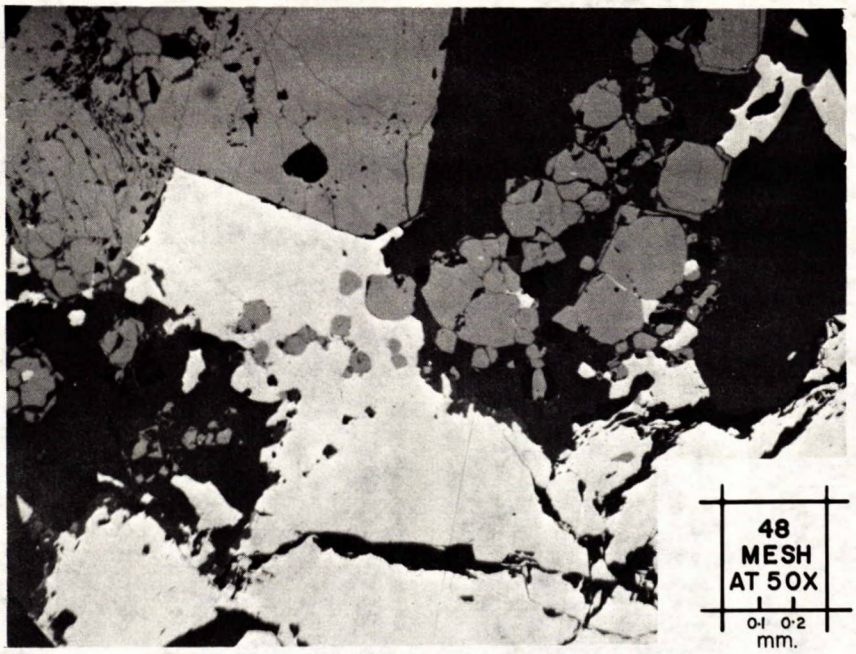

Figure 5 Photomicrograph of a polished section showing masses and euhedral grains of magnetite (grey) in chalcopyrite (white) and gangue (dark grey).

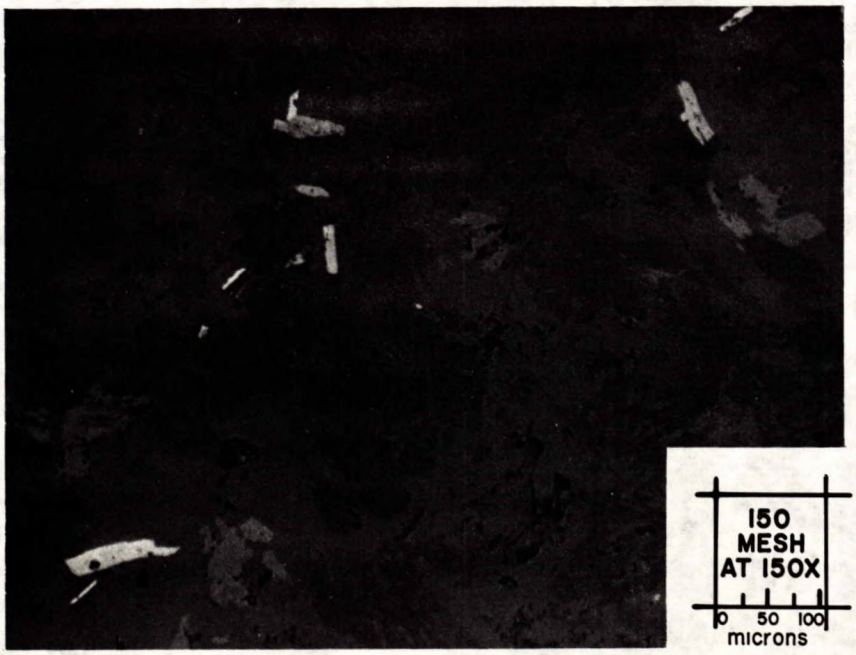

Figure 6 Photomicrograph of a polished section showing molybdenite grains (white) in gangue (dark grey).