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THE AMERICAN MINERALOGIST, VOL. 53, MARCH–APRIL, 1968

SECOND OCCURRENCE OF MAROKITE

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The compound $CaMn_2O^4$ was first produced synthetically by Riboud and Muan (1963). Shortly thereafter a mineral with this ideal composition was identified by Gaudefroy, Jouravsky and Permingeat (1963) in ore from Tachgagalt, Morocco, and named marokite. Its crystal structure has been reported by Lepicard and Protas (1966).

We have recently identified marokite as a rare mineral in the ore from Black Rock Mine, N.W. Cape Province, Republic of South Africa. The geology of this area is briefly described by De Villiers and Herbstein (1967). Marokite was found in one sample only. The sample has a fibrous appearance owing to densely packed slender crystals. Marokite occurs as remnants in an unidentified alteration product(s) which is associated with pyrolusite in the form of possibly vug fillings and veins, cryptomelane as veins and opaline silica in vugs. A semi-quantitative spectrochemical analysis was carried out on 16 mg of material and the results conformed to the formula $CaMn_2O_4$. The Debye-Scherrer pattern (FeK_α) agreed well with that given by Gaudefroy *et al.* (loc. cit.). Incontrovertible evidence that our material is indeed marokite was given by single-crystal oscillation and Weissenberg photographs of a small fragment; we obtained cell dimensions and systematic absences identical with those reported by the other workers.

ACKNOWLEDGEMENTS

We are grateful to the South African Iron and Steel Corporation Ltd. for permission to publish this paper; to Dr. J. G. D. Steyn for drawing attention to the report on marokite.

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and to Dr. H. W. Radmacher in whose laboratory the spectrochemical determinations were carried out.

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THE AMERICAN MINERALOGIST, VOL. 53, MARCH–APRIL, 1968

THE SYSTEM Ag_3AuS_2-Ag_2S

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Introduction

A considerable number of investigations have been conducted on the silver chalcogenides due to interest in their electrical properties. The system Cu_2S-Ag_2S has been examined in detail (Skinner, 1966) because several compounds in this system occur as ore minerals, and also because a portion of the system contains compounds which have interesting electrical properties (Graf, 1967). In contrast, very little information is available concerning the system Ag-Au-S. As a consequence, after completing an investigation of the electrical properties of a portion of the system Cu_2S-Ag_2S, a brief investigation was conducted on the system Ag_3AuS_2-Ag_2S, resulting in the determination of the eutectoid phase diagram from room temperature up to 200°C.

Experimental Procedure

The various compounds were formed by sintering the elements (99.999% purity) in evacuated and sealed glass tubes until none of the free elements remained. The preparation of the desired compounds was then verified by powder X-ray diffraction. The samples for measurements were obtained by filing powders from the sintered ingots. The measurements were made by D. T. A. and by electrical resistivity methods. The D.T.A. apparatus consisted of a Kanthal-wound furnace heated by a motor-driven variac, a Hewlett-Packard model 425A microvolt-ammeter for amplifying the signal from the differential thermocouple, and a Moseley x-y recorder for recording the signals. The sample holder was made of pyrophyllite which is easily machined and is suitable for low temperature use. A heating rate of 10°/min was employed for the D.T.A. The electrical resistivity measurements were made on samples which were fabricated by pressing the powders into pellets. These