NOTES AND NEWS

RE-EXAMINATION OF BOKSPUTITE*

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Introduction

Bokspute, $Bi_2Pb_6C_3O_{15}$, was described by E. D. Mountain (1935) from Boksput, Gordonia, Cape Province, South Africa. No other occurrences of boksputite have been recorded, but another new bismuth mineral, bismoclite, described in the same paper has since been found from several other localities (Schaller, 1941, and Frondel, 1943).

During the fall of 1945 the writer was concerned with the examination of a suite of secondary bismuth minerals from numerous pegmatites in Colorado and New Mexico. Most of the material proved to be bismutite by the *x*-ray powder method, but several of the specimens contained beyerite (Frondel, 1943; Heinrich, 1946), and a few *x*-ray patterns could not be matched. The only secondary bismuth mineral whose *x*-ray powder photograph was not in the film library of the Harvard Mineralogical Laboratory was boksputite. Accordingly the writer applied to Professor Mountain who generously sent a sample of "some of the original powder of boksputite from which the analysed material was obtained." The writer wishes to acknowledge the assistance of Professor Clifford Frondel both through discussions and a reading of the manuscript.

Examination

A powder *x*-ray photograph of the type material supplied by Professor Mountain is identical with that of bismutite (Frondel, 1943, pp. 524–525). Microscopic examination of the gray powder reveals the presence of three distinct minerals. The most abundant is nearly opaque, but near the edges of thin splinters a deep yellow brown color is apparent. It is attacked by the high index liquids ($n = 1.82$) with the evolution of bubbles of carbon dioxide. This substance is very likely the bismutite.

The second most abundant mineral occurs in minute plates marked by a wavy extinction and a pleochroism of light yellow to deep yellow. The birefringence is high. The indices of refraction are considerably above the highest liquid used (1.82). The plates show a negative Bx_a figure with 2V nearly 90°. The mineral is identified as massicot.

The third substance, which is very minor in amount, is colorless and isotropic. The index of refraction is close to that of the second mineral.

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Conclusion

The writer believes that the substance described by Mountain under the name boksputite is a mixture essentially of bismutite and massicot. Other minor impurities may be present. The determination of the material as a new mineral species rested upon the chemical analysis and the *x*-ray photograph made by F. A. Bannister for Professor Mountain. The *x*-ray powder diffraction data obtained are not cited in the paper.

The analysis of boksputite approximates the ratio $6PbO \cdot Bi_2O_3 \cdot 3CO_2$ or $Bi_2Pb_6C_3O_{15}$, a rather complex formula for a supergene mineral, particularly for a secondary lead-bismuth mineral. Most supergene minerals are exceedingly simple in their chemical composition. Professor Mountain's analysis, recalculated to 100% for the three major constituents, is shown in Column 1. The composition of $Bi_2Pb_6C_3O_{15}$ is given in Column 2.

	1	2
PbO	69.23	69.13
Bi_2O_3	23.60	24.05
CO_2	7.17	6.82
	100.00	100.00

The approach of the analysis to a relatively simple atomic ratio must be regarded as fortuitous in the light of the rigid *x*-ray evidence and the presence of abundant microscopical impurities. It is difficult to explain the fact, however, unless the analysis is erroneous, that CO_2 is present in an amount greater than that required to combine with Bi_2O_3 to form Bi_2CO_5.

References

Frondel, Clifford, *Am. Mineral.*, **28**, 521–535 (1943).
———, *Am. Mineral.*, **28**, 536–540 (1943).
Heinrich, E. Wm., *Am. Mineral.*, **31**, 198 (1946).
Mountain, E. D., *Mineral. Mag.*, **24**, 59–64 (1935).
Schaller, W. T., *Am. Mineral.*, **26**, 651 (1941).