

URANINITE AND PITCHBLENDE*

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ABSTRACT

It is proposed to use the name uraninite for the crystalline (isometric), essentially uranium dioxide (UO_2) mineral, with specific gravity varying from 8.0 to 10.5 and with low water content, and the name pitchblende for its massive or colloform amorphous equivalent (mineraloid) with specific gravity varying from 6.8 up to 8.5 and water content varying from about 2 per cent to 5 per cent.

Uraninite and pitchblende are usually treated as synonyms, sometimes one name being used, sometimes the other.

Some mineralogists have attempted to distinguish (*A*) the distinctly crystalline mineral from (*B*) the massive, often colloform, mineral or mineraloid of lower specific gravity and higher water content. The writer (1), for example, mentions uraninite as the crystalline equivalent of pitchblende. Ellsworth (2) in an important paper, "Rare-Element Minerals of Canada", lists uraninite and pitchblende separately and makes the following statement: "Uraninite is usually crystallized in forms of the cubic system, whereas pitchblende never shows indications of crystal form. Thus it seems advisable to consider these as two different minerals."

Emmons (3) evidently considers uraninite and pitchblende to be distinctive minerals, for he makes the following statement: "Uraninite, pitchblende (a uranium oxide), and carnotite ($\text{K}_2\text{O} \cdot \text{UO}_3 \cdot \text{V}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$) are the chief uranium minerals"

In the latest edition of Dana's *Textbook of Mineralogy* Ford (4, pp. 45-46) distinguishes (1) crystallized uraninite from (2) massive uraninite, but includes them both under uraninite. Palache, Berman, and Frondel (5, pp. 613-614) adopt the same procedure in the new (7th) edition of *The System of Mineralogy*.

This is the conservative attitude of many mineralogists, but since a fairly sharp distinction can be made between (*A*) and (*B*) it seems reasonable to separate them and to use distinctive names.

Kirsch (6) distinguishes "1. Kristallisierte Pechblenden" and "2. Unkristallisierte Pechblenden." For 1 he uses the name *ulrichite* in honor of the Austrian mining specialist, C. Ulrich, with *bröggerite*, *cleveite*, and *nivenite* as varieties, and for 2 he uses the name *uranpecherz*.

It seems better to use the well-known name uraninite for the crystal-

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line mineral with higher specific gravity and lower water content and pitchblende for the massive mineraloid* with lower specific gravity and higher water content.

Uraninite usually occurs in granite pegmatites, and pitchblende is, for the most part, found in metalliferous veins, but it should be emphasized that intrinsic characters and not geological occurrence should be used in distinguishing and determining minerals and mineraloids.

Of these two important uranium minerals, pitchblende is the more common. It occurs at Jachymov (Joachimstal), Bohemia; Great Bear Lake, Canada; and in the Belgian Congo. Uraninite occurs in pegmatites in Ontario, New England, Norway, Karelia, and India.

Yagoda (8) in an important paper makes a sharp distinction between crystalline uraninite and massive pitchblende. The former has a P_a value (the number of escaping rays per sq. cm. per sec.) varying from 338 to 271, whereas the latter (pure pitchblende) has a P_a value varying from 278 to 246.

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REFERENCES

1. ROGERS, A. F., *Introduction to the Study of Minerals and Rocks*, 2d. ed., p. 324, N.Y. (1921).
2. ELLSWORTH, H. V., *Canada Dept. of Mines Geological Survey*, Econ. Geol. Series, no. 11, p. 45, p. 131 (1932).
3. EMMONS, W. H., *The Principles of Economic Geology*, 2nd ed. p. 468, N.Y. (1940).
4. FORD, W. E., *A Textbook of Mineralogy* by E. S. Dana, 4th ed., N.Y., pp. 645-646 (1932).
5. PALACHE, C., BERMAN, H., AND FRONDEL, C., *The System of Mineralogy of J.D. and E. S. Dana*, 7th ed., vol. 1, pp. 613-614, N.Y. (1944).
6. KIRSCH, G., *Tschermak's Min. u. Pet. Mitth.* **38**, 223-228 (1925).
7. NIEDŹWIEDZKI, J., *Centralblatt für Min., Geol., u. Paleon.* (1909) pp. 661-663.
8. YAGODA, H., *Am. Mineral.* **31**, 92 (1946).

* This useful term was introduced by Nied'wiedzki (7).