

THE PROBABLE IDENTITY OF URANOTHALLITE AND LIEBIGITE.<sup>1</sup>

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The available descriptions of uranothallite and liebigite indicate them to be very similar, except in chemical composition. Three fairly satisfactory analyses of uranothallite are available and the composition must be near  $2\text{CaO}\cdot\text{UO}_3\cdot 3\text{CO}_2\cdot 10\text{H}_2\text{O}$ . The only published analysis of liebigite was made in duplicate on 85 and 65 mg of the mineral and appears to lead to a different formula,  $\text{CaO}\cdot\text{UO}_3\cdot 2\text{CO}_2\cdot 20\text{H}_2\text{O}$ .

An optical study made by the author shows, however, that either the two minerals are identical, or many of the specimens supposed to be liebigite are merely uranothallite. Three specimens labeled liebigite<sup>2</sup> and two labeled uranothallite<sup>3</sup> have the following characteristic optical properties:

Optically+,  $2E = 65^\circ \pm 3^\circ$ ,  $2V = 42^\circ \pm 2^\circ$ . Dispersion  $\rho > v$  easily perceptible. Nearly colorless in section and with a cleavage normal to X.  $\alpha = 1.500 \pm 0.003$ ;  $\beta = 1.503 \pm 0.003$ ;  $\gamma = 1.537 \pm 0.003$ .

The author has been unable to get any of the original liebigite; a very small grain would be sufficient to determine the optical properties. However, it is at least certain that much so-called liebigite is uranothallite, and it is not unlikely that the original analysis of liebigite, made on so small an amount of material, is in error, and that liebigite is identical with uranothallite. Altho the name liebigite has priority, it is recommended that the name *uranothallite* be retained for the mineral since the first accurate description was published under this name. Its composition may be accepted as  $2\text{CaO}\cdot\text{UO}_3\cdot 3\text{CO}_2\cdot 10\text{H}_2\text{O}$ , and liebigite should not be given the rank of a species unless it is shown to be distinct by further study.

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<sup>2</sup> Two from Schneeberg, Saxony (U. S. Nat. Mus. Cat. No. 45643, and Yale Univ. Brush Coll., No. 2995) and one from Joachimsthal, Bohemia (Am. Mus. Nat. Hist., N. Y.)

<sup>3</sup> Both from Joachimsthal, Bohemia; one U. S. Nat. Mus. Cat. No. 52057 and the other in Colonel Roebing's collection.