



## On the composition of the arseniates of uranium

M. Werther

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## ON THE COMPOSITION OF THE ARSENIATES OF URANIUM.

BY M. WERTHER.

The author observes that arsenic acid acts like phosphoric acid on the oxide of uranium. It is easy to obtain salts with one or two equivalents of metal; as to trisalt, M. Werther cannot positively affirm that it exists.

To analyse these arseniates, the author dissolved them in hydrochloric acid, then boiled with sulphurous acid, and precipitated the arsenic by sulphuretted hydrogen; the filtered solution was afterwards precipitated by ammonia, as in other analyses. He always obtained more exact results by estimating the arsenic acid by difference.

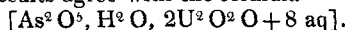
The arseniate with one equivalent of uranium is obtained by evaporating the oxide of the nitrate or acetate of uranium with an excess of arsenic acid, and allowing it to remain over sulphuric acid. The salt then appears in small crystals grouped together, but which are not measurable. It is soluble in mineral acids and carbonate of ammonia, insoluble in acetic acid and in water. When strongly calcined it yields anhydrous arsenic acid, oxygen and a subsalt, the composition of which has not been determined.

If the solution of the salt in arsenic acid be treated with ammonia, a bright yellow precipitate is obtained which contains ammonia.

This salt yielded by analysis,—oxide of uranium, 48.17; water, 13.7. Heated to 302° F. the salt lost 9.2 to 10.8 per cent. of water, which agrees with the formula  $[\text{As}^2\text{O}^5, 2\text{H}^2\text{O}, \text{U}^2\text{O}^2\text{O} + 3\text{aq}]$ .

The diarseniate of uranium, like the corresponding phosphate, may be obtained by different processes.

a. By adding arsenic acid to acetate of uranium, washing the pale yellow precipitate, and drying it over sulphuric acid. The product is insoluble in water and in acetic acid. Analysis:—oxide of uranium, 59.05; water, 17.2; it loses at 248° F. 15.07 per cent. of water. These results agree with the formula



b. When nitrate of uranium is boiled with arsenic acid till a good part of the nitric acid is expelled, on water being added to the liquid, a yellow powder separates, which, when completely washed and analysed, gives the same composition as the preceding.

c. If a solution of biarseniate of potash be added to one of nitrate of uranium, a pale yellow crystalline powder separates. This salt always contains potash, but not as much as an equivalent. Analysis:—water by calcination, 11.3; at 266°, 10.5; oxide of uranium, 60.85; potash, 2.7. The calcined salt contains 67.84 per cent. of oxide of uranium, and 3.6 per cent. of potash.

If an excess of trisarseniate of soda be added to a solution of nitrate of uranium, a pale yellow powder separates, and the liquid contains no uranium. The precipitate appears viscid, and passes through the filter during washing. It must therefore be washed with a solution of sal-ammoniac, and then with weak alcohol.

This salt contains—soda, 5.91; oxide of uranium, 60.21 to 61.13; water, 9.91; that is to say  $[\text{As}^2\text{O}^5, \text{Na}^2\text{O}, 2\text{U}^2\text{O}^2\text{O} + 5\text{aq}]$ . It is therefore a sodio-arseniate of uranium.—*Journ. de Ph. et de Ch.*, Juillet 1848.