

XXI.—*On the Sulphites of Potash, Chromium, Lithia and Bismuth.*

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In Dr. Muspratt's† paper on the sulphites, the composition of the above-mentioned salts was not ascertained; I therefore undertook

* The publication of this paper has been deferred at the request of the author.

† Liebig's *Annalen*, Band L. 1844, page 259.

their preparation and analysis, with a view of lessening the gaps in this interesting series.

Sulphite of potash.—This salt was obtained by passing sulphurous acid through an aqueous solution of potash until the liquid smelt strongly of the gas; ether was then added to the solution, which was placed in a flask, well corked, and allowed to stand at rest for three weeks—during this time a white crystalline precipitate was deposited.

0.2040 grm. gave 0.2729 grm. sulphate of baryta = 0.0746 sulphurous acid, or 36.56 per cent.

0.1204 grm. gave 0.1600 grm. sulphate of baryta = 0.0437 sulphurous acid, or 36.29 per cent. Centesimally represented :

		Theory.	Found.		Mean.
			I.	II.	
1 equiv. of Potash	. . . 48	53.93	—	—	—
1 „ „ Sulphurous acid	32	35.95	36.56	36.29	36.42
1 „ „ Water.	9	10.11	—	—	—
		89	99.99		

Formula $\text{KO SO}_2 + \text{aq.}$

I can only account for the excess in the sulphurous acid from the presence of traces of sulphuric acid in the salt. It has been remarked that a *sulphite* can scarcely be kept for an hour exposed to the air, without a portion being converted into *sulphate*; in this respect the salts of sulphurous acid differ from those of selenious acid, which do not oxidize on exposure.*

Sulphite of Chromium.—This salt is formed by passing sulphurous acid through water, holding in suspension freshly precipitated oxide of chromium; when the gas was passed through the menstruum for some time, the whole becomes clear, forming a dark green liquid. If the solution be now boiled to expel the excess of acid, a green powder is deposited, having the following composition :

$2 \text{Cr}_2 \text{O}_3 \cdot 3 \text{SO}_2 + 16 \text{aq.}$ or $2 (\text{Cr}_2 \text{O}_3 \cdot \text{SO}_2) + \text{HO SO}_2 + 15 \text{aq.}$

I expected to find the chromium salt correspond with the sulphites of alumina and sesquioxide of iron, but the analytical results at once destroyed the supposed analogy. The following formulæ represent the three compounds :

Sulphite of alumina . . . $\text{Al}_2 \text{O}_3 \cdot \text{SO}_2 + 4 \text{aq.}$

Sesquisulphite of iron . . . $\text{Fe}_2 \text{O}_3 \cdot \text{SO}_3 + 7 \text{aq.}$

Sulphite of chromium : . . $2 \text{Cr}_2 \text{O}_3 \cdot 3 \text{SO}_2 = 16 \text{aq.}$

The analysis of the salt yielded the following results :

0.1020 grm. gave, when heated to redness, 0.0408 grm. of the oxide of chromium, or 40.00 per cent.

* On the salts of selenious acid, Quart. Journ. of Chem. Society, April 1, 1849, page 54.

0·1467 grm. gave 0·1280 grm. sulphate of baryta = 0·0350 sulphurous acid, or 23·85 per cent. Centesimally represented :

	Theory.		Found.
1 equiv. of Oxide of chromium . .	160	40·00	40·00
3 „ „ Sulphurous acid . . .	96	24 00	23·85
16 „ „ Water	144	36·00	—
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	400	100·00	

When heated in a test tube, moisture and sulphurous acid are given off; when the heat is continued for some time, a mirror forms on the upper part of the tube, disappearing when the heat is increased.

Sulphite of Lithia.—If sulphurous acid be passed through water, holding in suspension the carbonate of lithia, the whole soon dissolves, forming a colourless liquid; the salt may be procured either by adding absolute alcohol, or by boiling the solution to expel the free acid, when white feathery crystals are deposited, which, on exposure to the atmosphere, become of a light yellow colour.

0·0563 grm. gave 0·0663 grm. sulphate of baryta = 0·01821 sulphurous acid, or 32·14 per cent. Centesimally represented :

	Theory.		Found.
1 equiv. of Lithia	14	14·00	—
1 „ „ Sulphurous acid . .	32	32·00	32·14
6 „ „ Water	54	54·00	—
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	100	100·00	

Formula $\text{LiO SO}_2 + 6 \text{ aq.}$

Sulphite of Bismuth.—I obtained this salt by agitating freshly precipitated oxide of bismuth with a strong solution of sulphurous acid, keeping the mixture in a flask well corked for four days; the precipitate was of a straw colour, but became nearly white when dry. Heated in a test tube, the salt sublimed, giving off no moisture.

0·1810 grm. gave 0·1593 grm. oxide of bismuth, or 81·01 per cent. centesimally represented :

	Theory.		Found.
1 equiv. of Oxide of bismuth .	237	88·10	88·01
1 „ „ Sulphurous acid . .	32	11·89	—
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	269	99·99	

Formula $\text{BiO}_3 \text{ SO}_2$.

The oxide of bismuth obtained by heating the nitrate to redness, does not absorb *any* sulphurous acid.

This sulphite, in all probability, corresponds with the carbonate $\text{BiO}_3 \text{ CO}_2$?