The furnace is an up and down draught made by Geith, of Coburg, Germany, from designs of Seger, and has a zone of at least seventy-five cubic inches that is perfectly uniform in heat. The dish of borax glass and the pyrometric trials were placed in the center of this zone.

The dish lost in three hours 0.1115 grams or 1.47 per cent.

SUMMARY OF THE RESULTS OBTAINED BY PROF. LANGENBECK.

Amount of borax glass, grams.	Duration of heat, hours.	Maximum temperature.	Means of measuring the temperature.	Loss, grams.	Loss in per cent.
2.3036	60	1410° C.	Seger's cone, No. 9.	6.0260	48.98
5.7698	48	1350° C.	Seger's cone, No. 7.	1.2926	22.40
9.2036	26	1050° C.	Alloy 15 % Ag 85 % Au.	0.7259	7.88
7.5803	3	954° C.	Ag.	0.1115	1.47

[CONTRIBUTIONS FROM THE CHEMICAL LABORATORY OF THE UNIVERSITY OF CINCINNATI. XLVI.]

ON THE VOLATILITY OF SODIUM FLUORIDE.[1]

BY SIGMUND WALDBOTT, PH.D.

THE analyses mentioned in Experiments A III and A IV of the foregoing communication did not at first give perfectly satisfactory results. In the endeavor to ascertain the cause of the deficiency, the analytical method employed was subjected to a careful examination.

This method, as described by A. Reischle,[2] is based on the principle that boric acid can be easily driven off from a borate by mixing it with six times its weight of resublimed ammonium fluoride, and heating carefully until all the boron is volatilized as ammonium borofluoride.

The residue, consisting of the fluorides of the metals that were combined with boric acid, is then treated with sulphuric acid and evaporated to dryness. The sulphates are ignited and weighed, and the amount of boric acid, if desired, is calculated from the difference between the original weight and the weight of the oxides present in the sulphates.

[1] Read before the Cincinnati Section, February 15, 1894.

[2] A. Reischle, *Ztschr. anorg. Chem.*, 4, 111-116. Abst. in *J. Chem. Soc.*, 1893, (abstracts) p. 491.

This process, according to comparative tests made by Reischle, has proved to be the best of all known methods for determining boric acid indirectly. Several analyses carried out in the laboratory of the University of Cincinnati confirm its reliability.

Experience shows, however, that a few precautions must be closely observed in order to insure accurate results.

The ammonium fluoride employed must be resublimed, or at least the residue left on sublimation must be carefully determined and the necessary deduction made from the final weighing.

Another source of possible error seemed to lie in the volatility of the alkaline fluorides at a comparatively low temperature, and some abnormal results recorded by Reischle, were probably due to this cause.

As nothing has been published on this subject it seemed desirable to examine closely the behavior of sodium fluoride, at least at varying temperatures, and bring the results of the study to bear upon the details of the Reischle method.

The sodium fluoride employed was chemically pure and procured from C. Schuchardt in Görlitz.

The following experimental results were obtained:

I.

NaF not dried, = 0.5605 gram.
Heated over the Bunsen burner, = 0.5495 gram.
Heated again for two minutes, = 0.5490 gram.

This weight, 0.5490 gram of dry NaF, was further heated as follows:

Time of heating, minutes.	Mode of heating.	Loss each time, gram.	Total loss, gram.	Total loss in per cent.
2	Moderate blast flame	0.0040	0.0040	0.71
6	Bunsen burner with chimney, crucible slightly uncovered	0.0020	0.0060	1.09
2	Blast-flame, crucible uncovered	0.0167	0.0227	4.1
12	Bunsen burner with chimney, crucible slightly uncovered	0.0060	0.0287	5.2

II.

NaF not dried, = 0.2775 gram.
Heated over Bunsen burner to constant weight, = 0.2714 gram.

This weight, 0.2714 gram of dried NaF, was further heated as follows:

Time of heating, minutes.	Mode of heating.	Loss each time, gram.	Total loss, gram.	Loss in per cent.
6	Bunsen burner, crucible slightly uncovered	0.0039	0.0039	1.4
5	Bunsen burner, crucible slightly uncovered	0.0034	0.0073	2.7
5	Bunsen burner, lid off, contents half melted	0.0047	0.0120	4.4
10	Small flame, bottom just red hot, crucible slightly covered	0.0010	0.0130	4.9
15	Same, but flame slightly reduced	0.0003	0.0133	4.9

It follows from these experiments that the full flame of a Bunsen burner, if applied to 0.549 gram of sodium fluoride, will cause a loss of nearly 0.4 per cent. in six minutes, and if applied to 0.2714 gram will cause a loss of 1.4 per cent. in six minutes, while if the flame be reduced so that it will hardly redden the bottom of the covered platinum crucible there will be no very appreciable loss in fifteen minutes.

By observing these two precautions—subjecting sufficient material to analysis to yield not less than 0.6 gram sodium fluoride and applying as little heat as possible—the Reischle method gives excellent results, and the slight discrepancy between the results of the analysis in Experiment A V of the preceding paper, executed after the fact of the volatilization of sodium fluoride was ascertained, and the results of the analyses in experiments A III and A IV is readily accounted for.

In conclusion I wish to express to Prof. Norton my sincerest thanks for the many courtesies extended to me during these experiments. I feel likewise much indebted to Prof. Langenbeck for his kindness in having carried out the experiments on a larger scale as before recorded.

CINCINNATI, MARCH 21, 1894.

ELECTROLYTIC SEPARATIONS.

BY EDGAR F. SMITH AND HENRY E. SPENCER.

Received May 5, 1894.

I. SILVER FROM COPPER.

THE literature relating to electrolysis contains two suggestions bearing upon the separation of these metals. The first is that of Classen, (Quantitative Analyse durch Elektrolyse, dritte Auflage, p. 124). In reality this is not an electrolytic method