2. Evidence has been obtained that the gold in sodium aurothiosulfate is in the aurous condition.

3. A method for the preservation of the sodium aurothiosulfate is presented.

CHICAGO, ILLINOIS

[CONTRIBUTION FROM THE CHEMICAL LABORATORY, MISSOURI SCHOOL OF MINES AND METALLURGY]

THE ELECTROMETRIC DETERMINATION OF TELLURIUM IN THE PRESENCE OF FERRIC IRON, SELENIUM AND COPPER

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The quantitative oxidation of tellurous acid to telluric acid by excess of potassium dichromate has been shown by Lenher and Wakefield[1] to be applicable to the volumetric determination of tellurium. The purpose of this investigation was to study the applicability of the electrometric method to this titration.

In converting Lenher and Wakefield's method, with slight modifications, to an electrometric titration, to avoid the use of a spot plate indicator, their results as a whole have been verified. The method is based on the following reaction: $3TeO_2 + K_2Cr_2O_7 + 4H_2SO_4 \longrightarrow 3H_2TeO_4 + K_2SO_4 + Cr_2(SO_4)_3 + H_2O$, the excess of dichromate being titrated against ferrous sulfate. It was found that selenium dioxide is not affected by potassium dichromate under similar conditions.

Method and Materials.—Samples of pure tellurium dioxide or aliquot portions of a stock solution of the same material were used. The tellurium dioxide was dissolved in a very small amount of sodium hydroxide solution, and sufficient dilute acid added to bring the final acidity to the

TABLE I

TITRATION OF TELLURIUM DIOXIDE

10–20 cc. of H_2SO_4 (d. 1.84)

$CuSO_4.5H_2O$ taken, g.	SeO_2 taken, g.	TeO_2 taken, g.	No. of analyses	Error of average, mg.	Av. deviation from av. mg.
Part 1					
0	0	0.2527	5	−0.14	0.18
0	0.1390	.2527	5	− .06	.10
Part 2					
0	.0556	.1015–.4023	7	− .06	.20
Part 3					
0	0	.2520	3	+ .13	.13
0.062–0.500	0	.2520	4	− .10	.10
.125	.0556	.2068	2	− .15	.15

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[1] Lenher and Wakefield, THIS JOURNAL, **45**, 1423 (1923).

proper value. Water was added so that in each case the volume was 200 cc. A small excess of 0.1 *N* potassium dichromate solution was added and the solution allowed to stand for 45–60 minutes. The excess of dichromate was titrated against a standard solution of ferrous iron (ferrous ammonium sulfate), using an Eppley titration apparatus.

A ratio between the potassium dichromate and ferrous iron solutions was determined at the close of each day's work. The dichromate solution was standardized against specially purified tellurium dioxide.

Part 1 of the table shows that tellurium dioxide is quantitatively oxidized to the telluric state by potassium dichromate, and that selenium dioxide has no effect upon the determination. Selenium dioxide in quantities up to .2780 g. does not affect the titration of potassium dichromate by ferrous sulfate.

Part 2 indicates the accuracy of the method for various amounts of tellurium dioxide in the presence of selenium dioxide.

Part 3 indicates that tellurium dioxide may be accurately determined in the presence of both selenium and copper.

Summary

1. Tellurium in large or small amounts may be rapidly and accurately determined by oxidizing with an excess of potassium dichromate and titrating the latter electrometrically with ferrous sulfate.

2. Small amounts of selenium and copper do not interfere with the determination.

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[CONTRIBUTION FROM THE FIXED NITROGEN RESEARCH LABORATORY, UNITED STATES DEPARTMENT OF AGRICULTURE]

THE THERMAL DISSOCIATION OF SODIUM CARBIDE

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It has been recently shown[1] that the fixation of nitrogen as sodium cyanide in a heated system consisting of sodium carbonate, carbon, iron and nitrogen, involves as one step the formation of sodium carbide. It was desirable, therefore, to investigate the conditions of stability of sodium carbide or, more specifically, to study the equilibrium between sodium vapor, carbon and sodium carbide. This paper deals for the most part with the dissociation pressure of sodium from solid sodium carbide. As will be shown, this dissociation pressure becomes one atmosphere below the temperatures used in the commercial production of sodium cyanide, and it would, therefore, be useful in the study of this fixation reaction to have data on the equilibrium between sodium and sodium carbide in the

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[1] Guernsey and Sherman, THIS JOURNAL, **47**, 1932 (1925).