A New Compound of Tin(IV) with 8-Quinolinol and its Use in Gravimetric Analysis

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Shiba[1] reported that tin(II) was precipitated with 8-quinolinol (oxine) from dilute ammoniacal solution. As to the oxinate of tin(IV), Gentry and Sherrington[2] found that tin(IV) was extractable by oxine chloroform solution. They estimated the formula of the extractable oxinate of tin to be $Sn(C_9H_6NO)_4$. No report has been published, however, on the formation of a stable precipitate of oxine compound of tin(IV).

According to the present authors' experiments, tin(IV) is precipitated quantitatively from 0.2 N hydrochloric acid solution by adding oxine solution, but at the other concentrations of hydrochloric acid, the precipitation is not complete, as is shown in Fig. 1.

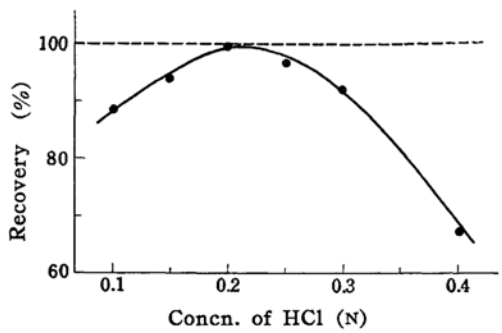

Fig. 1. Effect of hydrochloric acid concentration on the precipitation of tin(IV) oxinate.

The color of the precipitate is brilliant yellow. The compound is stable against heating at least up to 360°C. It is insoluble in mineral acid or alkaline solutions except for concentrated sulfuric acid. It is also insoluble in ordinary organic solvents. The chemical composition of the precipitate is as follows:

Anal. Found: Sn, 24.9; Cl, 15.2; C, 45.05; H, 2.63; N, 5.68*. Calcd. for $SnCl_2(C_9H_6NO)_2$; Sn, 24.8; Cl, 14.8; C, 45.2; H, 2.54; N, 5.87%.

The ionic species of tin(IV) in 0.2 N hydrochloric acid solution was examined by the aid of ion-exchange resin (Dowex 50), and it was found the charge of the species to be +2, which seems to justify the above mentioned chemical composition of the compound.

The application of this compound to the gravimetric determination of tin was then examined. The recommended procedure is the following.

Adjust the acidity to 0.2 N hydrochloric acid. Add the same volume of 2% oxine solution**. Keep the solution at 70~90°C for 1.5~2 hr. Filter with a glass filter, wash with 3 N hydrochloric acid, dry at 110~120°C and then weigh as $SnCl_2(C_9H_6NO)_2$.

Table I. Determination of tin as oxinate

Sn taken (mg.)	Sn oxinate (mg.)	Sn found (mg.)	Error (mg.)
1.00	3.5	0.87	0.13
1.99	8.0	1.99	0.00
2.99	11.9	2.96	0.03
4.98	19.2	4.77	0.21
9.96	39.5	9.81	0.15

Some results are shown in Table I. No metallic salt except molybdenum interferes. Bismuth and antimony should be absent because of their hydrolysis in the condition of the procedure. Presence of nitrate or phosphate leads to the hydrolysis of stannic ions. The precipitate of oxinate is not formed under the presence of tartrate.

1) Y. Shiba, *Repts. Gov. Ind. Research Inst. Tokyo*, 27, No. 8, 12 (1932).
2) C. Gentry and L. Sherrington, *Analyst*, 75, 17 (1950).

* The analyses of carbon, hydrogen and nitrogen were carried out at the Institute of Physical and Chemical Research.

** The oxine solution: Dissolve 6 g. of oxine in 5 ml. of concentrated hydrochloric acid, and dilute to 300 ml. with distilled water.

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