# SHORT COMMUNICATIONS

## *Extraction of Tellurium with Dithizone*

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Although various metal-dithizone complexes have so far been studied and effectively used for the extraction or the colorimetric determination of metals, dithizone complex of tellurium has not been reported. Recently, ion exchange resin study of tellurium by Y. Sasaki1) proved that in a dilute hydrochloric acid solution tellurium (IV) can exist as positively charged ion (TeO(OH)$^+$ or Te (OH)$_3{}^+$). From the fact that polonium, a homologue of tellurium, combines with dithizone to form a complex, it is expected that positively charged tellurium, when shaken with a dithizone solution, may form a dithizone complex, which is extractable from the aqueous solution into an organic layer.

To confirm the presence of such a complex of tellurium, the following experiments were carried out by the present author.

**(I) Extraction of Tellurium.**—As a tracer, carrier-free radioactive tellurium (chiefly Te-129 and Te-129 m) was prepared from fission products with cation and anion exchange resins*,1).

The extraction of carrier-free radioactive tellurium from hydrochloric acid solution was carried out with $1.8\times10^{-3}$ M dithizone in carbon tetrachloride. Fig. 1 shows the relationship between the percentage of extraction and the pH of the aqueous solution used. The latter was adjusted with hydrochloric acid and ammonium hydroxide.

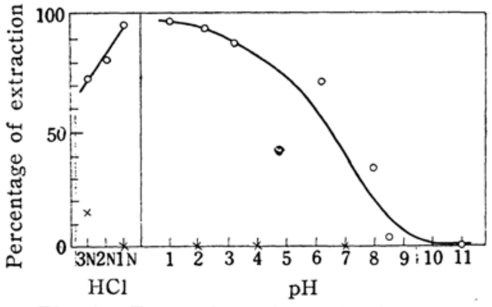

Fig. 1. Extraction of carrier-free tellurium with dithizone carbon tetrachloride solution.

○, extraction with dithizone carbon tetrachloride solution ($1.8\times10^{-3}$ M)

×, extraction with carbon tetrachloride volume of organic phase: 2 ml; volume of aqueous phase: 10 ml

From Fig. 1, it can be seen that tellurium is extracted to some extent with carbon tetrachloride solution of dithizone, but not with carbon tetrachloride over the pH range investigated. (the percentage of extraction from 3 N hydrochloric acid exceptionally amounts to 14%.)

Then 0.5 N hydrochloric acid solutions containing various quantities of tellurium from $10^{-5}$ to 1 mg. were prepared and the extraction was tried with $0.6\times10^{-3}$ M dithizone carbon tetrachloride solution. The results obtained are shown in Fig. 2. The percentage of extraction is plotted as a function of the quantity of tellurium used.

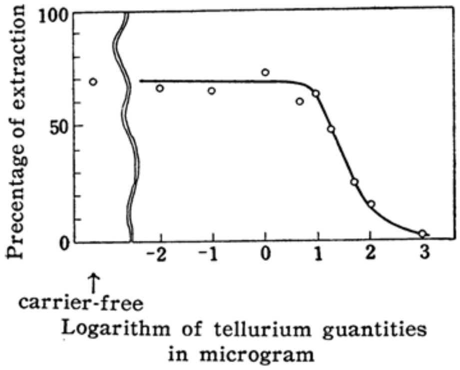

Fig. 2 Extraction of macro-scale tellurium with dithizone carbon tetrachloride solution ($0.6\times10^{-3}$ M) volume of organic phase: 2 ml; volume of aqueous phase: 10 ml.

**(II) Color of the Dithizone Solution Containing Tellurium.**—The author observed that the green color of carbon tetrachloride solution of dithizone turns yellowish green in the presence of tellurium. Spectrophotometric measurement showed that the residual green color is probably due to uncomplexed dithizone. It was also observed that dithizone complex of tellurium has a maximum absorption at 430 m$\mu$.

**(III) Volatility of the Extracted Compound.**—K. Kimura and the present author2) previously reported that polonium dithizonate sublimes at a temperature around 120°C. Similar behavior was observed with the extracted compound of carrier-free tellurium. This indicates the similarity of the complex of tellurium to that of polonium.

These experiments described above led the author to the conclusion that tellurium (IV) forms a complex with dithizon. The study of this complex is now in progress; its detail will be reported in a separate paper.

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1) Y. Sasaki, *Japan Analyst*, 4, 637 (1955).

2) K. Kimura, and H. Mabuchi, This Bulletin, 28, 535 (1955).