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SOME SOLUBILITY AND WASHING DATA FOR FERRIC NITRATE
IN ETHER SOLUTIONS OF URANYL NITRATE

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IN ETHYL SOLUTIONS OF UREALY NITRATE

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SOME SOLUBILITY AND WASHING DATA FOR FERRIC NITRATE
IN ETHER SOLUTIONS OF URANYL NITRATE

I. INTRODUCTION AND DISCUSSION

In connection with the washing of ether extracts of uranyl nitrate derived from pitchblende, it was necessary to obtain information about the solubility of ferric nitrate in ether and about its rate of washing out of ether.

It was found that on shaking a 20% $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ solution with an ether solution of uranyl nitrate, the iron content of the ether layer progressively decreased after the two layers had separated, and that equilibrium was not attained for many hours. This is ascribed to fine droplets of the aqueous phase suspended in the ether phase, and is of general significance in such extractions. Equally significant is the observation that such suspended material readily washes out to the same final value as that obtained by washing out dissolved ferric nitrate, but that several portions of wash water are required to achieve this result.

II. EXPERIMENTAL

Portions of a neutral ether extract containing uranyl nitrate equivalent to 390 g/l of uranium ^{were} ~~more~~ shaken with varying amounts

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of a 20% $\text{Fe}(\text{NO}_3)_2 \cdot 9\text{H}_2\text{O}$ solution. Samples of the ether layers were withdrawn and analyzed for Fe by the colorimetric O-phenanthroline method after various intervals of standing. In a typical case the following results were obtained:

TABLE I

<u>Time of standing</u>	<u>Fe in ether layer (mg/l)</u>
1 minute	120
5 minutes	72
10 minutes	37
20 minutes	20
60 minutes	12
2 hours	7.6
18 hours	2.4

In all other cases the same value of 2.4 mg/l of Fe in the ether uranyl nitrate solution was attained after 18 hours standing, and this was taken as the equilibrium value at 25°C.

Two one liter portions of neutral ether solution containing 450 g/l of uranyl nitrate were each shaken with 5 ml of 20% $\text{Fe}(\text{NO}_3)_2 \cdot 9\text{H}_2\text{O}$ solution. One portion stood ^{for 20 minutes} in a separatory funnel before withdrawal of the water layer and was then washed with ten successive 10 ml portions of distilled water spaced 10 minutes apart. The second

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portion stood 18 hours before withdrawal of the water layer and was then washed exactly like the first portion. Ether layer samples ~~were~~ ^{were} withdrawn after each wash and were analyzed for Fe by the O-phenanthroline method. The results are plotted in Figure 1 and indicate that suspended iron removed by dilution, though initially much higher than the dissolved iron, is washed out at a faster rate.

III. SUMMARY

Solubility and washing data of ferric nitrate in an ethereal solution of uranyl nitrate have been taken. It was found that complete separation between the ether and aqueous phases of uranyl nitrate solutions is attained only after long standing. Dispersed droplets of aqueous iron solution are washed out of ether at a faster rate than is iron in true solution, hence, after a relatively small number of washes the final value is attained regardless of previous settling.

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FIGURE 1

WASHING OF FERRIC NITRATE FROM ETHEREAL URANYL NITRATE SOLUTION

- A. 20 Minutes separation period.
- B. 18 hours separation period.

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KEUFFEL & ESSER CO., N. Y. NO. 359-14
Millimeters, 5 mm. lines accented, cm. lines heavy.
MADE IN U. S. A.

Mgm Fe per Liter of Extract

✓ 42 6