

The precipitate was washed about twenty times with pure water, in which it is insoluble. Difficulty was experienced in drying the precipitate as a slight decomposition with simultaneous discoloration of the compound took place very readily. However, one product which was fairly white was obtained by drying over phosphorus pentoxide in a vacuum for several days and another was obtained by drying in the oven at 60° to constant weight.

Weighed portions of the precipitate so prepared were used to determine the titanium and iodate content. Titanium was determined by basic acetate precipitation. Iodate was determined by reduction with potassium iodide and titration of the liberated iodine by sodium thiosulfate solution.

The results, which indicate that the compound is a double salt of formula $Ti(IO_3)_4 \cdot 3KIO_3$, are shown below

% Titanium found	% Iodate found
3.48 (dried over P_2O_5)	87.39 (dried over P_2O_5)
3.58 (dried over P_2O_5)	
3.56 (dried in oven)	88.32 (dried in oven)
3.40 (dried in oven)	88.35 (dried in oven)
Av. 3.50%	Av. 88.02%
Titanium calculated, 3.46%	Iodate calculated, 88.10%

Summary

A new gravimetric method for the determination of titanium has been described, in which the titanium is precipitated as a double potassium titanium iodate whose probable composition is $Ti(IO_3)_4 \cdot 3KIO_3$. The new method separates titanium quantitatively from a large number of the elements commonly occurring with it in ores, notably aluminum.

A procedure for the separation and determination of small amounts of zirconium from large amounts of titanium has been described.

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NOTE

A Neutral Buffered Standard for Hydrogen Ion Work and Accurate Titrations Which Can be Prepared in One Minute

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Most of the standard buffer solutions recommended in the literature must be prepared with considerable care and one cannot be sure of the result unless all the precautions of quantitative analysis are used. A simply prepared solution that can be relied on for standardizing quinhydrone electrodes, etc., is therefore much to be desired. Standardized buffer mixtures are on the market for this purpose.

Ammonium acetate solution has for a number of years been used by one of us in lecture demonstrations of buffer activity, for which purpose

it is very effective. Since the dissociation constants for ammonium hydroxide and acetic acid are often given in the literature as identical values, we decided to make an accurate determination of the P_{H} value of ammonium acetate solutions. Theoretically they should be neutral.

A quinhydrone electrode of the Cullen¹ type was used and a standard buffer solution (Arthur H. Thomas) $4.63 \pm 0.01 P_{\text{H}}$ at 25° , was checked with it to the second decimal place. The following determinations were then made.

TABLE I
AMMONIUM ACETATE SOLUTION USED

	P_{H} value found
Approx. 0.5 <i>N</i> made with boiled distilled water	7.00
Approx. 0.1 <i>N</i> made with unboiled distilled water	{ 7.01
Approx. 0.05 <i>N</i> made with unboiled distilled water	{ 7.01
Approx. 0.5 <i>N</i> soln. (above) through which laboratory air had been bubbled for five minutes	7.01 6.95

From these results it is apparent that ammonium acetate solutions, through wide limits of concentration, are as nearly neutral as one could hope to get a solution, and are stable toward laboratory conditions. Since such a standard solution can be made in a moment's time there is no occasion, in any event, to store the solutions.

It may be pointed out that whereas buffered solutions, in general, change their P_{H} values only a little by dilution, the P_{H} value of a perfectly neutral buffer such as this one should not change at all on dilution.

The ammonium acetate solution above described is not only valuable as a standardizing solution for quinhydrone electrodes, etc., but may also be used as a standard in titrations when an exactly neutral end-point is desired. If one wishes to bring the color of his indicator exactly to the neutral point it is not necessary to guess at it. Indicator may be introduced into an ammonium acetate solution with assurance that it will assume a neutral tint which can be used for comparison.

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