

Tribasic phosphoric acid gives no precipitate with silver nitrate, barium chloride, or albumen.

Dibasic phosphoric acid gives a precipitate with silver nitrate and barium chloride, but none with albumen.

Monobasic phosphoric acid gives a precipitate with all three.

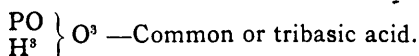
This latter acid is usually prepared by dissolving phosphorus in nitric acid, by long digestion, evaporating and heating so as to drive off as much water as possible; or by heating common ammonium phosphate $(\text{NH}_4)_2\text{H} \left\{ \begin{array}{l} \text{PO} \\ \text{H} \end{array} \right\} \text{O}_3 - (\text{NH}_4)_2\text{O} = \text{H} \left\{ \begin{array}{l} \text{PO} \\ \text{H} \end{array} \right\} \text{O}_3$.

Prepared in either of these ways and dissolved in cold water, it gives an immediate whitish precipitate with ferric chloride, as also with albumen; both these precipitate even in moderately dilute solutions. Heated for some time, it loses its power of precipitating albumen, but continues to act upon ferric salt. Boiled for a long time it precipitates neither. Pyrophosphoric acid obtained by decomposition of the lead salt, by hydrosulphuric acid, exhibits the same reaction as regards ferric chloride, boiled for some time it loses this power being converted into tribasic acid.

It appears therefore that both pyrophosphoric acid (Dohme) and metaphosphoric acid possess the power of producing a precipitate in ferric chloride, I may add, insoluble in acetic acid and not very easily soluble in hydrochloric acid, and hence ferric chloride may be employed as a good test for distinguishing the phosphoric acids. I am not aware that this fact has been noticed, and we are indebted to Mr. Dohme for its discovery. The numerous experiments which have led to this paper, were made for me by Mr. Cathron.

In using glacial phosphoric acid for medicinal purposes, it would therefore be well to boil the solution for some time, say half-an hour, before adding to the solution of iron.

For convenience of students, I append formulas showing derivation of acids and salts.



$\text{PO} \left\{ \begin{array}{l} \text{H}^3 \\ \text{H}^3 \end{array} \right\} \text{O}^3 - \text{H}^2\text{O} = \text{H} \left\{ \begin{array}{l} \text{PO} \\ \text{H} \end{array} \right\} \text{O}^2 \text{ — Metaphosphoric or monobasic acid.}$