NOTE ON A POSSIBLE NEW METHOD OF QUALITATIVE IDENTIFICATION OF THE CHLORID, BROMID AND IODID IONS.

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In his admirable work on Qualitative Analysis, J. Stieglitz mentions the fact that the presence of an Iodid will interfere with the test for Phosphates by the Molybdate method, and, incidentally, outlines a method for elimination of the Iodids before proceeding with the test for Phosphate ion.

While studying this method and in connection with un-

successful efforts to prove the presence of Phosphate in the presence of the halogon ions, one of us observed a peculiar series of color changes which caused us to carry the work a little farther, and this work, limited in scope as yet, is given, as hinting at a possible method of qualitative identification of the halogen ions, by the molybdate method, even though in the presence of phosphate ion.

Without going into detail at this time, we offer a summary of our experiments. The following solutions were prepared: KI, KBr, NaCl, HNa2PO4 were made up in saturated, N1, N.2, N.1, N.02, N.01, N.001, N.0005 solutions. Ammonium Molybdate solution was made up by method of Olson (Quantitative Analysis, p. 507), and allowed to stand three days before using. Two cc. of this molybdate solution were added to 1 cc. of each of the above solutions, under two conditions—allowing one sample of each mixture to stand in the cold for two hours, and another sample mixture of each content to undergo heat to continued boiling. The following table will indicate results of these two methods of procedure:

Solution Used.	Heated to Boiling.	On Standing in Cold.
Sat. KI	Immediate blue color, to red; I vapor, changing to yellowish tint.	Same color changes, I settles.
KI-N1	Same.	Same.
KI-N.2	Same.	Same.
KI-N.1	Same.	Same.
KI-N.02	Same.	No blue, only red.
KI-N.01	Red color only; I vapor off while hot.	Red color only.
KI-N.001	Same.	Same.
KI-N.0005	No change.	No change.
KBr-Nat.-N.1	Yellow supernatant liquid.	No change.
KBr, less concentrated	No change	No change
NaCl, all concentrations	No change	No change
Na2HPO4	Usual yellow ppt.	Yellow ppt.

The same procedure was then undertaken with mixtures of varying concentrations of the standard solutions, as follows: 1 cc. of each solution and 2 cc. of ammonium molybdate:

Mixture.	Heated to Boiling	AgNO3 added to Filtrate.	NH4OH Added
KI-N1, KBr-N1	Same as I alone	Yellowish ppt.	As usual with AgBr ppt.
KI-N1, KBr-N.02	Same	Small ppt.	Same
KI-N1, KBr-N.01	Red as with I alone	Faint ppt.	Clears at once
KI-N1 alone	As usual	Faint ppt.	Clears at once
KI-N1, NaCl N1	Same as I alone	White ppt.	Clears
KI-N1 NaCl N.02	Same	White ppt.	Clears
KI-N1 NaCl N.01	Red	White ppt.	Clears
KI-N1 NaCl N.001	Red	White ppt.	Clears
KI-N1 NaCl N.0005	No change	Faint ppt.	Clears
KI-N1 KBr N1 NaCl N1	Blue-red, I vapor Yellow s-n liq.	Heavy ppt.	Difficultly clears
HNa2PO4 N1 KI N1	Quickly deep blue Usual changes	Faint wh. ppt.	Clears
Na2HPO4 N1 KI N1 NaCl N1 KBr N1	Same Yellow s-n liq.	Heavy wh. ppt.	Difficultly clears

The above general results were also observed to be true in case of the mixture of the standard solution of like nature, but of lower concentration. To eliminate tabulation at this time, this is made as a general summary of further experiments.

To summarize: Within the above limitations as to concentration, at least, the following method of differentation of the four ions involved is suggested:

Treat the unknown solution, as usual, by alkali carbonates in excess and sodium hydroxid, to remove the heavy metals. Filter. To the filtrate add nitric acid to neutral. Add twice the volume of Ammonium Molybdate solution, prepared as above mentioned. Heat to boiling. Continue boiling until blue color indicating Iodids, if present, suddenly changes to red and until I vapors and no longer evolved. Filter. If Br is present, the filtrate is of a yellow color. Add AgNO3 to this filtrate. A heavy ppt., soluble in NH4OH indicates chlorids. A heavy yellow residue of the usual type, as resulting from filtration before addition of AgNO3, indicates the presence of Phosphates.

A further limitation is noted in the fact that if chlorids and bromids are both present in the unknown, the yellow color of filtrate will indicate presence of bromids, but the presence of Iodids will only be indicated by the amount of

precipitate and the readiness in which it dissolves in NH4OH.

As at first stated, this method is in its inception, and we propose to carry out the data to more complete results in the near future. The matter is laid before you as suggestive, only.