# NOTE.

The Precipitation of Arsenic Sulfide from Arsenates.—The precipitation of arsenic sulfide from acid solutions of arsenates by hydrogen sulfide may be greatly hastened by the presence of a soluble iodide. This catalytic effect is doubtless due to the reduction of the arsenic acid to arsenious acid by the hydriodic acid, the iodine being continuously reconverted to hydriodic acid by the hydrogen sulfide.

$$H_3AsO_4 + 2\,HI \rightarrow H_3AsO_3 + H_2O + I_2; \quad H_2S + I_2 \rightleftharpoons 2\,HI + S.$$
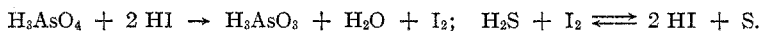
The arsenious acid yields arsenic trisulfide readily, particularly in the presence of free hydrochloric acid. The assumed reduction of the arsenate to arsenite is confirmed by analysis of the precipitate, which is found to be mainly arsenic trisulfide and sulfur, with varying amounts of the pentasulfide.

This has been applied in the work in qualitative analysis at the University of Illinois in the following way. Just before passing in the hydrogen sulfide, 1 or 2 cc. of 1.0 N ammonium iodide solution (potassium or sodium iodide would vitiate subsequent tests for these cations) is added to the hot solution, which contains 4 cc. of 6 N hydrochloric acid in a volume of 40 cc. Precipitation begins immediately, and is usually complete in 4 or 5 minutes, depending on concentrations, temperature, agitation and so forth. Not only is the time for complete precipitation of pentavalent arsenic shortened to approximately $1/3$ of that usually required, but the chances are much lessened that the student will fail to detect arsenic because of non-precipitation at this point.

Apparent complications arise in the precipitation of mercury and copper as iodides and in the partial reduction of the former to the mercurous state. However, these effects are rectified during the digestion with ammonium polysulfide, which oxidizes both metals to the higher valence, precipitating them as mercuric and cupric sulfides.

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