The Production of Antimony (V) Oxide by the Combination of Antimony and Nitric Acid

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Four supplies of antimony powder each weighing 48.7040 (0.40 gm atom) were placed in 2 l beakers. The supplies were covered with 200 ml of concentrated nitric acid and heated under an open hood and over a bunsen burner flame until all the nitrogen dioxide gas had evolved. White solids in water remained and they were filtered, washed six times with 900 ml of distilled water and left to dry. These solids then were heated in open beakers of suitable size over a bunsen burner flame until yellow solids weighing 64.5288 gm were produced (99.729% based on antimony).

Neither any pictures nor any data could be obtained as a sample of the combined products was subjected to X-ray analysis with copper radiation.

The reaction between antimony and concentrated nitric acid was similar to the one involving tin and concentrated nitric acid [1] and this was evidenced by the color and the yield of the product. The X-ray analysis also was evidence and it was shown from this that the product was amorphous [2] otherwise pictures and data would have been obtained. Since the antimony nitric acid reaction is similar to the tin nitric acid reaction, the equation for the preparation of antimony (V) oxide is:

$$Sb + 10\,HNO_3 \xrightarrow{\Delta} Sb_2O_5 + 10\,NO_2\uparrow + 5\,H_2O\uparrow.$$
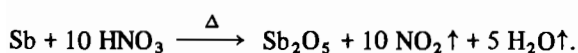
Antimony (V) oxide also can be prepared by; reacting antimony (III) oxide with nitric acid [3], the thermal decomposition of antimonic acid (H_3AsO_4) [4], the reaction involving antimony (V) chloride and water [5] and the oxidation of antimony (III) chloride with nitric acid followed by dilution and then subjecting the resulting orthoantimonic acid to thermal decomposition [6].

Acknowledgement

References

1 Belcher, Colbert and Rowley, Properties and Numerical Relationships Of The Common Elements And Compounds, Appleton-Century-Crofts, New York, N.Y., 1962, pp. 46–47.
2 Don Roach and Edmund Laddy Jr., Basic College Chemistry, McGraw-Hill Book Company, New York, N.Y., 1979, p. 592.
3 Lattimer and Hildebrand, Reference Book Of Inorganic Chemistry Third Edition, The Macmillan Company, New York, N.Y., 1951, p. 1236.
4 Babor and Lehrman, Introductory College Chemistry Second Edition, Thomas Y. Crowell Company, New York, N.Y., 1950, pp. 604–605.
5 Brauer, Handbook Of Preparative Inorganic Chemistry Volume 1 Second Edition, Academic Press, New York, N.Y., 1963, pp. 616–617.
6 Babor and Lehrman, Introductory College Chemistry Second Edition, Thomas Y. Crowell Company, New York, N.Y., 1949, p. 605.