

but rather that in each case the loss of activity is dependent upon the conditions.

A theoretical explanation is offered for the conditions studied.

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NOTE.

A Simple Bath Used for the Solution of Samples in an Oxygen-free Atmosphere.—The apparatus here described has for its application the solution of materials requiring heat in the absence of air. If a non-aqueous bath is desired it should be planned on smaller dimensions to avoid undue loss of liquid used.

An eight-inch porcelain evaporating dish is used for the bath. (See Fig. 1.) In the evaporating dish are placed some glass beads and a five-inch porcelain desiccator plate having under supports. On this plate is placed a heavy circular, square or triangular glass rod support for the dish which is to contain the sample. This support holds the dish in position. (A small porcelain desiccator plate can be inverted and used for the same purpose, the supports serving as points which partially enclose

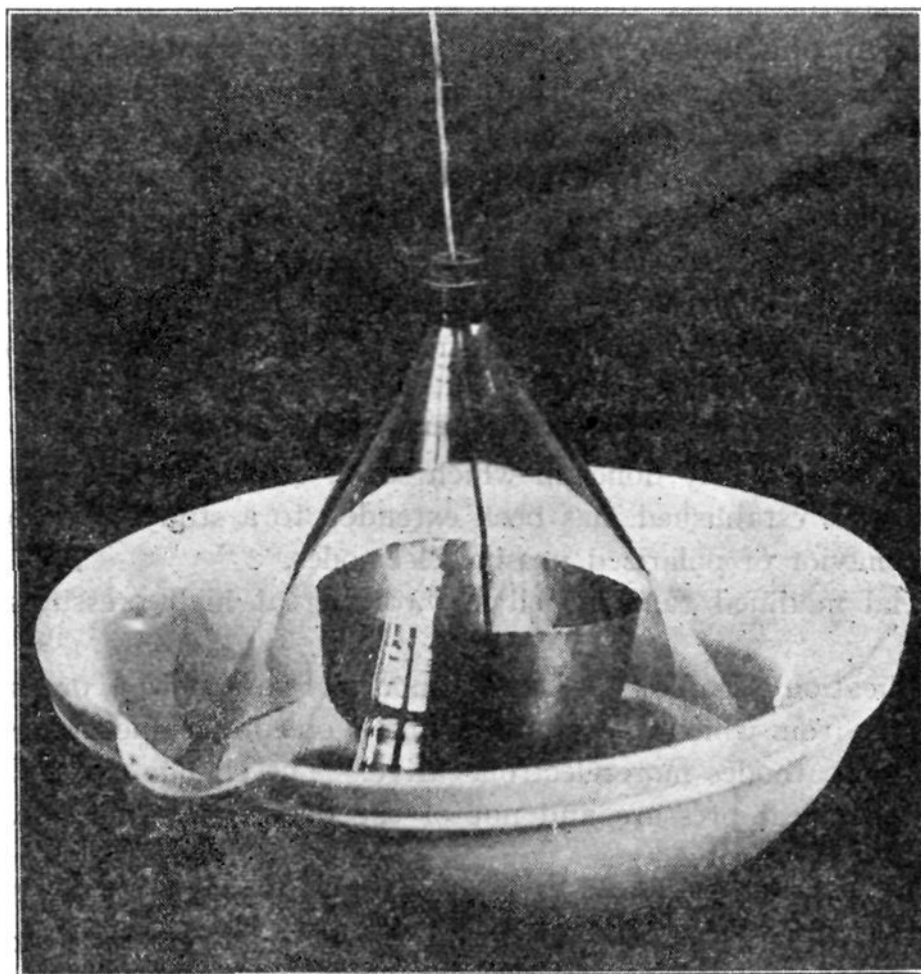


Fig. 1.

and support the dish.) Over the plate is inverted a six-inch funnel, with stem cut off, which extends down into the evaporating dish to a sufficient extent to form a trap when a liquid is poured into it. The liquid to be used is selected for the particular purpose at hand, *viz.*, water, a salt solution, an acid such as sulfuric acid or a nonaqueous solvent. Ordinarily the point to be considered is the adjustment of the atmosphere and temperature to suit the purpose of the experiment.

For the determination of ferrous iron in a silicate, a platinum dish is used as the inner container to hold the sample to be analyzed and a platinum rod is extended through the funnel into the dish. This rod is used for stirring and for the addition of hydrofluoric and sulfuric or hydrochloric acids. Phosphoric acid (1 : 2) is used as the solution to form a trap and also to furnish steam. Sufficient solution should be added to cause part of the platinum dish to be immersed. The advantage of phosphoric acid is that it elevates the boiling point of the water to such an extent that the solution contained in the platinum dish is heated much hotter than with water alone, also as more and more steam is evolved the phosphoric acid becomes more and more viscous, still forming a trap and evolving steam which keeps out the air, yet no crystallization occurs as in the case with many salt mixtures. The bath is heated by a direct flame or by an electric hot plate. Hot water, from which any dissolved gases have been removed by boiling, can be easily added to replenish the water lost by evaporation, a steady flow of steam being maintained without difficulty and a uniform heat obtained until the sample is thoroughly decomposed. However, with proper adjustment of volume of solution added at the beginning, and with proper intensity of boiling no addition of water is necessary during a heating period of an hour or even longer. After the sample is completely decomposed it is analyzed according to any reliable method for the determination of ferrous iron.¹ Air-free water should be used to dilute the solution and care should be exercised to avoid oxidation of the iron by the oxygen of the air.

This apparatus is simple, requires no accessories not available in any ordinary laboratory, and is easily adapted to particular temperatures by proper selection of boiling point mixtures. O. L. BARNEBEY.

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[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF THE OHIO STATE UNIVERSITY.]
THE OXIDATION OF ETHYL ALCOHOL BY MEANS OF POTASSIUM PERMANGANATE.

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During the early part of the latter half of the last century, it came to be recognized that the character of the oxidation products of both organic

¹ See Barnebey, *THIS JOURNAL*, 37, 1481, 1829 (1915).