free from iron, making blank determinations unnecessary; and (3) that silver does not reduce titanium at all, and reduces vanadium definitely to the quadrivalent state. The method is rapid in execution.

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NOTE.

Grinding Glass Tips for Drop-Weight Apparatus.—In order to make glass tips for use in "drop-weight" surface-tension measurements the usual procedure is to first grind the glass in a precision lathe until the cross section of the tube near the tip is a circle. This lateral surface is polished until it is smooth. It is then necessary to grind down the end of the tube until it is flat and the edges are sharp. In order to avoid chipping during the process various devices have been used. One of the most efficient of these methods previously used is that of imbedding the tip in a brass disc which is perfectly flat on the bottom. The hole through the brass is just a little larger than the glass tube. The latter is held in place by special wax which is melted, poured around the tube and allowed to harden. Glass tip and brass are then ground away simultaneously. However considerable trouble is experienced because particles of abrasive work into the wax around the edge of the tip. Fine glass and abrasive likewise work up into the small capillary opening and frequently become so tightly wedged into it that it is not possible to dislodge them without injury to the tip. When no supporting device is used for the tip while grinding the flat surface, lead glass is sometimes used because it is less easily splintered. However this kind of glass is often objectionable where it is necessary to seal the tip to another glass tube, as when an interface apparatus is to be made. It is also often desirable to use a glass which is not so easily attacked by strong reagents. Moreover, when viewed under the microscope a tip ground without having been inbedded in some supporting material not infrequently shows an imperfect edge.

To get around the use of the wax and in order to have a firm support for the tip edge during the grinding of the flat surface, the author has found Wood's metal or other similar low melting alloy to be admirable. Wood's metal melts at 65.5°; so that the glass will not be much heated by the molten alloy. The glass tube made ready for the final preparation of the face of the tip is supported in a vertical position with the tip against the flat bottom of a small cardboard box. The Wood's metal is melted in a test tube in a water bath and poured around the tip to a depth of about 10–15 mm. By raising and lowering the tube in the molten alloy or by applying a little suction to the tube the alloy is drawn a short distance into the capillary opening. Finally the tube is left with the tip against the bottom of the box until the alloy has solidified. When the paper is removed it is found that the tip is firmly imbedded in the alloy. Tube and alloy are then ground with about No. 180 carborundum on a flat, hard surface until the desired sharp edge is obtained.

To remove the Wood's metal from the tube and the small capillary opening it is only necessary to put the tip end into a test tube immersed in boiling water and allow the alloy to melt. The latter is then ready for another tube.

The effective radius of the glass tip is generally determined by getting the average weight of drops of water given at a definite temperature. Hence it is quite possible by a proper selection of a capillary tube with suitable size of wall and comparatively circular cross section to omit the previous grinding of the lateral surface. This gives a tip with a sharp edge and the glazed wall makes creeping impossible. Such tips can certainly be substituted for the more expensive ones where only a fair degree of accuracy is wanted and where a considerable outlay of money or waste of time would be involved in getting a proper assortment of sizes.

The method of grinding just outlined is especially useful when it becomes necessary to regrind a much-needed tip whose face has become slightly chipped.

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ACTION OF AROMATIC ALCOHOLS ON AROMATIC COMPOUNDS IN THE PRESENCE OF ALUMINUM CHLORIDE. II.

SECONDARY ALCOHOLS.

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The first article of this series[1] dealt with the condensation of a primary aromatic alcohol, benzyl alcohol, with benzene, using anhydrous aluminum chloride as a dehydrating agent.

In the present paper experiments are described in which some secondary alcohols were allowed to react with benzene under the influence of the same dehydrating agent. Three alcohols were studied. Two of these, methylphenylcarbinol and ethylphenylcarbinol, may be regarded as mixed aromatic aliphatic alcohols. The third, diphenylcarbinol or benzhydrol, is a true secondary aromatic alcohol. A comparative study of these three compounds should, therefore, give us some idea as to the relative effects of aryl and alkyl groups upon the reaction at hand.

It has been shown in the first article that the principal product of the reaction between benzyl alcohol and benzene in the presence of aluminum chloride is diphenylmethane.

[1] THIS JOURNAL, 38, 2527 (1916).