

NOTES AND CORRESPONDENCE

NOTE ON DUCTILITY TEST OF ASPHALT

In asphalt specifications, especially for asphaltic cements, where a ductility test is called for, it is usually made by pulling apart, at a speed of 5 cm. per minute, a briquette having at its center a cross section area of 1 sq. cm. Some machines used for this test are only slightly over a meter in length and many asphaltic cements of 60 to 70 penetration will run over 100 cm. The writer has been requested in several cases to compare asphalts supplied on specifications. In most cases specifications call for a ductility test of from 70 to 90 cm. at 5 cm. per minute. With few exceptions this requirement is met, briquettes not breaking under 110 cm., the limit of the writer's apparatus.

Ductility being a measure of surface tension, it is desirable to make the test indicate more sharply the difference between asphalts under examination. It is conceivable that of two asphalts showing a result of 110+ cm., one might run to 200 cm. before breaking, while the other would break below 150 cm. The writer has been using two speeds for some time, namely: 5 cm. per minute and 10 cm. per minute. Results show that the latter speed is still conservative and that no good asphaltic cement of the "pure bitumen" type would be done an injustice by adopting it.

The following results are typical (specifications called for minimum of 90 cm.).

Speed	5 cm. per minute	10 cm. per min.
Sample A.....	90 to 95	65
Sample B.....	110+	110+
Sample C.....	110+	110+

When examined after pulling to 110 cm. at 5 cm. per minute B and C threads appeared about the same size, but at 10 cm. per minute, the thread of C was about the size of a fine hair, while B was two or three times the apparent diameter of C.

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MONTREAL, CANADA, July 24, 1915

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THE ESTIMATION OF CARBON DIOXIDE IN THE ASH OF PLANT AND ANIMAL SUBSTANCES

In a recent article by George E. Boltz [THIS JOURNAL, 7 (1915), 859], it has been shown that during the combustion of plant substances for the estimation of ash, the carbon dioxide interacts with the basic oxides of calcium, potassium, sodium, etc., to form the respective carbonates which are not broken completely by further ignition.

While it is essential that some correction be introduced for accurate results, the modification suggested by the above author is rather long and tedious, *i. e.*, boiling the ash with 3.6 per cent hydrochloric acid for half an hour, absorbing the CO₂ evolved in a 4 per cent sodium hydroxide solution, neutralizing the same with normal HCl using phenolphthalein for an indicator; and finally introducing a few drops of methyl orange and titrating with N/20 HCl, using the factor 0.0022 g. CO₂ per cc. of N/20 HCl.

A much simpler method has been worked out by Gooch and Kuzirian (*Am. J. Sci.*, 31, 497), namely, the use of sodium paratungstate (5 Na₂O.12WO₃) which is easily prepared and well suited for the estimation of CO₂ by loss on ignition, when the sample is not required for other determinations. The time required is remarkably short and the results obtained are excellent.

The method of procedure is essentially as follows: Weigh the crude ash accurately, introduce a dry portion of this flux and weigh again, ignite over a low flame (generally a 3- to 5-minute ignition is sufficient), cool and weigh. The loss represents CO₂.

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IOWA AGRICULTURAL EXPERIMENT STATION
AMES, IOWA, November 15, 1915

THE USE OF COBALT NITRATE FOR MARKING ON PORCELAIN

In quantitative work it is very desirable that the porcelain Gooch crucibles used be so marked for identification that the mark will be permanent and will stand a high temperature of ignition.

Ink and soft lead pencil, when burned into the surface of porcelain, leave a light red mark which gradually fades away in use.

Fine results can be obtained by the use of a very dilute solution of cobalt nitrate for this purpose. It has been used in this laboratory for marking on porcelain with success.

The procedure adopted by the author is as follows: The porcelain is gently heated with a low flame, then with the sharp end of a burned taper or a pen, the desired mark is made and the same ignited with a strong flame for about three minutes, when a deep black mark remains. The advantage of a black mark on a white surface is that it enables one to see the mark from outside the desiccator.

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THE COST OF ESTIMATING POTASH AS POTASSIUM PLATINIC CHLORIDE

Editor of the Journal of Industrial and Engineering Chemistry:

For some time there has been more or less question concerning the loss of platinum in estimating potash as potassium platonic chloride and recovering the platinum. Since there seems to be very little data giving the actual loss in the process of reducing and recovering the platinum and the approximate cost of the process, the following may be of interest:

During a recent fertilizer season (1914), 670 potash determinations, averaging about 0.0300 g. of potash for each determination, were made in this laboratory with a loss of 5.02 g. of platinum not recovered. If platinum is worth \$1.80 per gram, this loss would amount to \$9.04. About one day's labor (which may be valued at \$4.00) was required for the recovery of the platinum saved making a total cost of \$13.04, or of \$0.0194 for each determination.

MICHIGAN AGRICULTURAL EXPERIMENT STATION
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IRON CARBONYL IN WATER GAS

In the course of some recent experiments a constant easily regulated supply of CO was required. Hydrogen being in no way detrimental, a steel cylinder of compressed water gas was used. The presence of iron in all parts of the apparatus was soon evident and could not be explained by any mechanical introduction in the slow stream of gas. The presence of Fe(CO)₅ seemed to be the most reasonable explanation.

Accordingly, a slow stream of the gas was passed through a glass tube, heated to about 250° C., and a metallic mirror formed almost instantly. It had the appearance of an antimony mirror, but test showed it to be pure iron.

Iron was determined quantitatively by passing a measured volume of the gas through a tube heated in five zones by small flames. Between each zone was a small plug of glass wool. It was found necessary to use these plugs as the iron is formed as a fine dust and is unavoidably carried out of the tube. The decomposition of the iron carbonyl was so complete that the first three plugs contained practically all of the iron not deposited as mirrors. The iron was dissolved in HCl, oxidized with HNO₃ and determined as Fe₂O₃ gravimetrically. A volume of