BWB Technologies

Determination of Alkalis in Cement
Oznaczanie Na_2O i K_2O w cementach

MS Spektrum

This method describes how soda and potash may be estimated in cement using a BWB Flame Photometer.

The addition of aluminium nitrate solution suppresses the interference caused by concentrations of lime up to 350 ppm, which is the equivalent concentration for cement, allowing for the effect of silica and alumina already present in solution.

For materials other than cement, the addition of aluminium nitrate can be adjusted according to the lime concentration expected. 30ml of the solution is sufficient for a CaO concentration of 1g/litre. Excess of aluminium nitrate is not harmful.

Equipment Required:

1. BWB Flame Photometer
2. Balance weighing +/-0.0005g
3. Whatman No. 40 filter paper
4. Sodium chloride (Reagent)
5. Potassium chloride (Reagent)
6. Concentrated HCl
7. Aluminium (high grade)
8. Concentrated HNO_3

Reagent Preparation:

Standard Solution

Dissolve 0.7915g KCl and 0.4715g NaCl with distilled water in the same 1 litre volumetric flask. Dilute to the mark with distilled water and mix well by inversion. This solution contains 500ppm K_2O. Dilute exactly 20mls of this solution in a 1 litre volumetric flask with 500ml distilled water and add 10ml concentrated HCl very slowly. Dilute to the mark with distilled water.

This is the universal standard containing 10ppm K_2O and 5ppm Na_2O and can be used for all purposes.

Aluminium Nitrate Solution:

Dissolve 30g of aluminium known to have a low alkali content (high grade) in 400ml of 50% HNO_3. When the aluminium has dissolved and the solution cooled dilute to 1 litre with distilled water.

Method:

1. Mix 0.500g cement with 20-30ml of distilled water, add 5ml of concentrated HCl and dilute to about 50ml.
2. Heat the solution to boiling.
3. Filter the solution through a 9cm No. 40 Whatman filter paper into a 500ml volumetric flask.
4. Wash the filter paper 6 times with 20ml each of hot distilled water.
5. Add 10ml of the aluminium nitrate solution.
6. Cool the solution and dilute to the mark with distilled water.
7. Prepare a series of standards by dilution of the universal standard ensuring that each prepared standard contains the equivalent of 1ml of concentrated HCl per 100mls.
8. Aspirate the set of standards directly into the Flame Photometer and enter each value of standards.
9. Aspirate the cement sample solution and read off the Na_2O concentration.
10. Calculate the alkali content of the cement by multiplying the ppm K_2O and Na_2O present in the sample solution by the dilution factor

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