Application Bulletin

Metrohm

Of interest to:
Laboratories in the cement industry

No. 17/2 e

Potentiometric routine determination of the $CaCO_3$ content in raw meal from the cement industry

Summary

An automatic potentiometric titration method is described for determining the $CaCO_3$ contents of raw meal. The sample is mixed with HCl and heated. The excess of HCl is backtitrated with NaOH.

Appparatus

- Combi-Titrator, consisting of
  - 2.632.0010 pH-Meter
  - 2.614.0010 Impulsomat
  - 2.665.0040 Dosimat Titrating Stand
  - 2.586.001X Labograph
- 6.3006.220 Exchange Unit with 20 mL burette cylindre
- 6.0202.000 combined glass electrode
- 6.2115.010 cable (connection 614/632)
- 3.980.3200 cable (connection 614/665/586)

Reagents

- Hydrochloric acid : c(HCl) = 1 mol/L
- Sodium hydroxide : c(NaOH) = 0.5 mol/L

Method

Thoroughly dry the raw meal sample, then weigh 1.25 g app. into a 250 mL Erlenmeyer flask. Pipette 25 mL of c(HCL) = 1 mol/L to the sample and bring it to boil. After boiling for 10 s, empty the content of the flask into a beaker and rinse well with distilled water. Titrate with c(NaOH) = 0.5 mol/L, the apparatus settings as follows:

Impulsomat	End-point	pH = 7.00
	Range	coarse
	dynamics	6
	t_{clock}	1.5 s
	t_{delay}	15 s
Burette titration speed		"3"

Calculation

A = mL sample c(HCl) = 1 mol/L

B = mL consumption c(NaOH) = 0.5 mol/L

E = weight of sample in mg

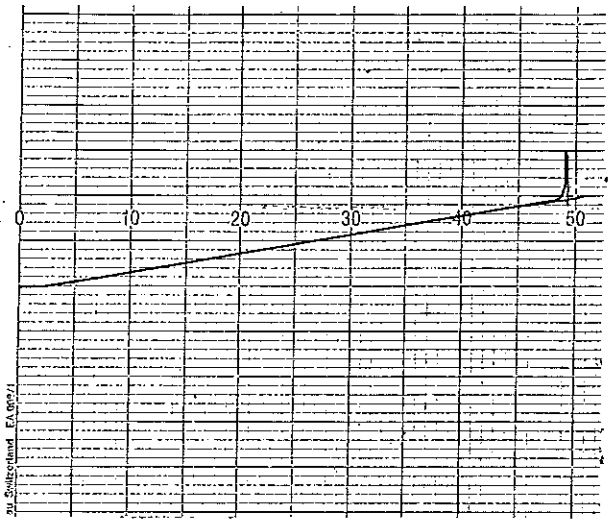
$$\% \ CaCO_3 = \frac{(A - 2B) \cdot 50.05 \cdot 100}{E}$$

Remarks

- HCl can be standardised with pure $CaCO_3$ (Merck p.a.); 1 g of substance is treated as mentioned above.
- The accuracy of the titration is ±0.1%.

Potentiometric routine determination of the $CaCO_3$ content in raw meal from the cement industry

Example



V/mL = 9.76

EP pH = 7
coarse
1.5 s / dynamics 6 / t delay 15 s
Burette "3"
Labograph 200 mm/min