
ION SELECTIVE ELECTRODES (ION)

THE PURPOSE OF THE EXERCISE

Fluoride determination of in real samples: mouthwash, toothpaste and tap water.

APPARATUS AND REAGENTS

Potentiometer equipped with fluoride selective electrode and silver chloride reference electrode, volumetric flasks, pipettes, wash bottle, NaF solution of 1mg F⁻/L (1000 ppm), TISAB buffer (Total Ionic Strength Adjustment Buffer).

PROCEDURE

By dilution of a standard solution no 1 (flask 1) prepare a series of standards solutions in measuring flasks with volume of 25 mL:

1. Into the flask (1), introduce 5 mL of 1 mg/mL fluoride stock solution, 10 mL of buffer and make up to the mark with water, mix.
2. Into the flask (2), add 5 mL of the solution 1, 10 mL of buffer, make up to the mark with water, mix.
3. Into the flask (3) introduce 5 mL of solution 2, 10 mL buffer, etc. as above
4. Introduce 5 mL of solution 3 into the flask (4), etc.
5. Introduce 5 mL of solution 4 into the flask (5), etc.

Fluoride determination in mouthwash:

Introduce 1 mL of mouthwash sample to the flask with volume of 25 mL. Add 10 mL of buffer and make up to the mark with water. Measure the potential.

Read off the corresponding fluoride concentration in the sample from the calibration curve.

Calculate the fluoride ion concentration (ppm, mg/L) in the mouthwash sample.

Fluoride determination in toothpaste:

Transfer 10 mL of paste suspension (or weigh approximately 2.4 g paste into a beaker and add 20 mL water) to the flask with volume of 25 mL. Add 10 mL of buffer and make up to 25 mL with distilled water. Measure the potential.

Read off the corresponding fluoride concentration in the sample from the calibration curve.

Calculate the fluoride ion concentration in the toothpaste in mgF⁻/kg (ppm).

Fluoride determination in tap water:

Introduce 10 mL of buffer to the flask with volume of 25 mL and make up to 25 mL with tap water.

Read off the corresponding fluoride concentration in the sample from the calibration curve.

Calculate the concentration of fluoride ions in tap water in mgF⁻/L (ppm).

LITERATURE

1. D. Kealey, P. J. Haines, *Analytical Chemistry*
2. D. Harvey, *Modern Analytical Chemistry*
3. Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch, *Fundamentals of Analytical Chemistry*
4. Douglas A. Skoog, F. James Holler, Stanley R. Crouch, *Principles of Instrumental Analysis*
5. B. Sivasankar, *Instrumental Methods of Analysis*