

10.16 Determination of iodine - Ion selective electrode method

Required equipment

- Ion Selective Electrode meter
- Electrodes
- Magnetic stirrer, stir bars – for stirring of samples and standards.

Required solutions

- a) Distilled or de-ionize water – to prepare all solutions and standards.
- b) Reference electrode filling solution.
 - i) Inner chamber filling solution.
 - ii) Outer chamber filling solution
- c) Standard solutions
 - i) Ionic strength adjustor (ISA) 5M NaNO₃ (to adjust to a constant back ground ionic strength)
 - ii) Iodide standard solution (0.1 M NaI)
- d) Preparation of 1000 ppm iodide stock standard from 0.1 M NaI:
Dilute the 0.1 M iodide standard, by pipetting 78.7 ml of standard into 1 litre volumetric flask. Add distilled water to make up the volume.
Store stock standards in plastic bottles and prepare fresh weekly. Lower concentration working standards used for calibration should be prepared daily.

Preparation of sample

Prepare the sample same as in fluoride determination. Take 50 ml aliquot and add 1 ml Ionic Strength Adjuster (ISA) in each sample and measure the concentration of iodine on ISE meter after calibration.

Preparation of working standard from the 1000 ppm iodide stock solution

1. 1 ppm iodide standard solution: Pipette 0.1 ml stock solution into 100 ml volumetric flask, dilute to volume with distilled water.
2. 10 ppm iodide standard solution: Pipette 1.0 ml stock solution into 100 ml volumetric flask, dilute to volume with distilled water.
3. 100 ppm iodide standard solution: Pipette 10.0 ml stock solution into 100 ml volumetric flask, dilute to volume with distilled water.

Take 50 ml aliquot and add 1 ml Ionic Strength Adjuster (ISA) in each standard and use for meter calibration.

Determination of iodide concentration

Connect iodide and double junction reference electrodes to ISE meter, place electrodes in standards for calibration of meter. After calibration of meter with two or three standards, place electrodes in sample and stir the solution at constant rate, read concentration of standard and unknown solutions directly from the meter.

Calculation

$$\% \text{ Iodide} = \frac{\text{Meter reading (ppm)} \times 100 \times 10^{-4}}{\text{Weight of sample (g)}}$$

Reference: Orion, Iodide electrodes instruction manual.