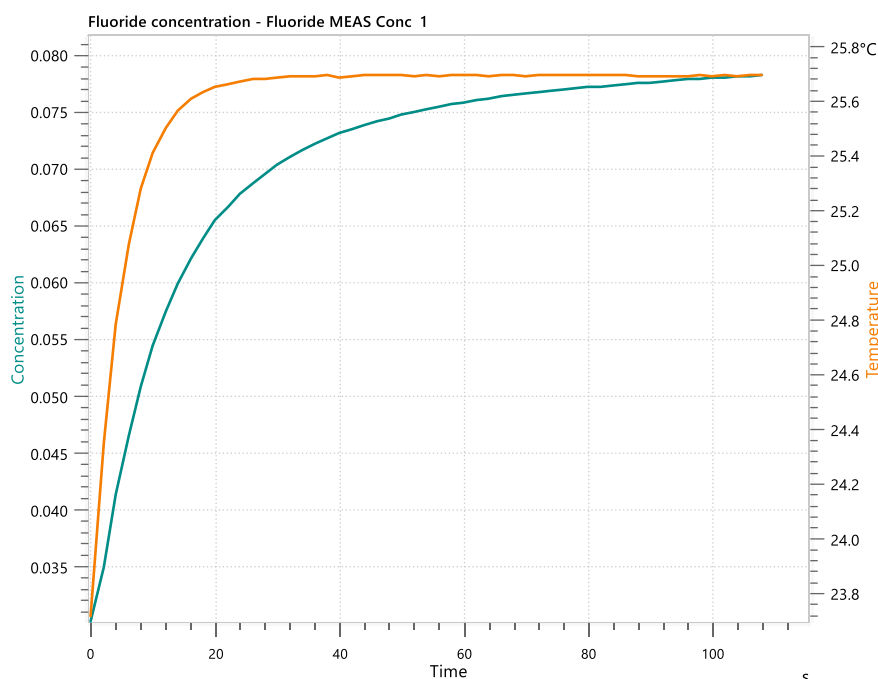


Fluoride in leachate

Fast determination of fluoride using direct measurement



Increased fluoride concentrations in water may cause tooth damage, growth disorders, and bone deformation. According to the World Health Organization (WHO), concentrations above 1.5 mg/L are critical.

One possible source of fluoride is landfills. Rain washes out harmful substances from landfills which can enter the groundwater. The leachate from landfills should thus be monitored for the fluoride concentration.

Ion measurement is a fast and inexpensive method to determine the fluoride content in water samples compared to other methods such as ion chromatography. This Application Note describes a reproducible and accurate measurement of the fluoride content using the fluoride ion-selective electrode with an OMNIS system.

Method description

Sample

Leachate

Sample preparation

No sample preparation is required.

Configuration



Ion-selective electrode, F	6.0502.150
LL ISE reference electrode	6.0750.100
Pt1000 temperature sensor	6.1110.100

Analysis

The fluoride content in leachates is determined by direct measurement after a calibration. When carrying out potential measurements with a fluoride ion selective electrode, it is important to work at a fixed ionic strength and pH value. In this case, this is achieved by using a total ionic strength adjustment buffer (TISAB).

For the calibration, different fluoride standard solutions are prepared. Their concentrations depend on the expected fluoride content. Diluted TISAB IV is added to the calibration standards and the potential of each standard is measured.

For the analysis, the sample and diluted TISAB IV are mixed in a fixed ratio. The potential of this solution is measured. The potential is automatically converted into the corresponding fluoride content by the software.

After each measurement, it is important to condition the electrode in order to obtain reproducible results. In this case, diluted TISAB IV is used.

Results

Sample (n = 5)	Fluoride content in mg/L	s(rel) / %
Leachate	0.076	2.1

Summary

Without much effort regarding materials and chemicals, direct measurement allows fast and accurate determination of the fluoride content. Despite the low fluoride content in leachate (below 0.1 mg/L), it was easy to measure such low concentrations with the ion-selective fluoride electrode.