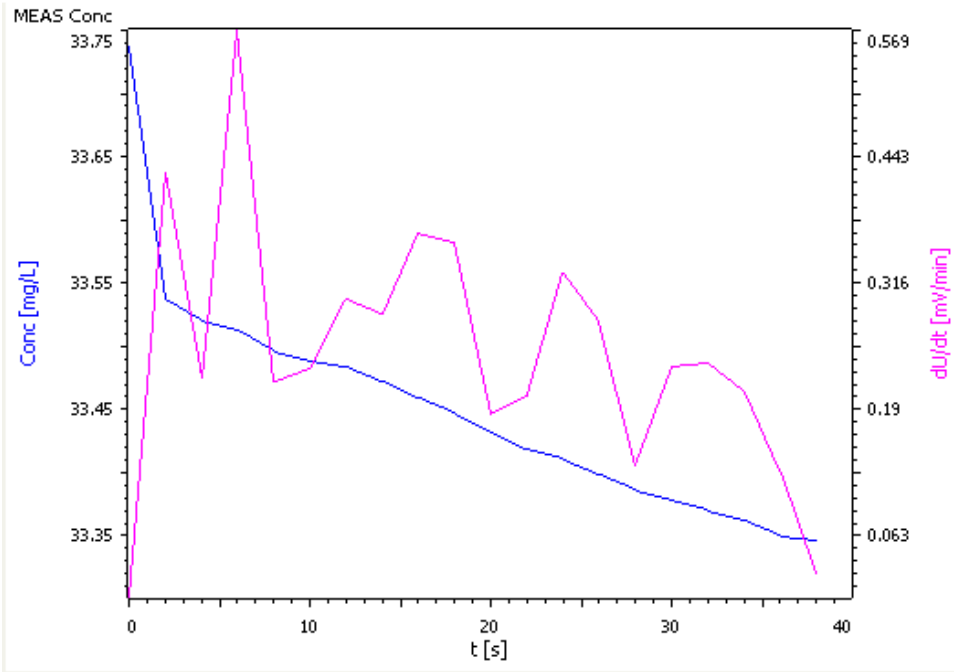
ISE Application Note I-024

Nitrate in surface water

Fast and inexpensive determination by direct measurement



Nitrate is naturally present in the environment. However, excessive concentrations of nitrate in surface and ground water are problematic as such concentrations have a negative effect on the water quality. Usually, excessive levels of nitrate are a direct result of extensive usage of fertilizers in agriculture. Nitrate is easily washed from soils and can end up in surface or ground water. As the nitrate content is regulated in many countries, a quick and inexpensive assessment of its concentration is required to monitor the water quality.

The nitrate concentration can easily be obtained by direct measurement using a nitrate ion selective electrode. First, a calibration is performed, afterwards, the samples are measured in less than a minute.

This is a fast, inexpensive and reliable method to determine the nitrate content in various water samples.

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Method description

Sample

Surface water

Sample preparation

No sample preparation is required.

Configuration

814 USB sample processor (1T/2P)	2.814.0020
Titration head, 3x SGJ 14	6.1458.040
Sample rack 22 x 120 mL	6.2041.470
Sample beakers plastic (PP), 120 mL, 250 pieces	6.1459.300
Propeller for 120 mL beaker	6.1909.050
802 Rod stirrer	2.802.0020
tiamo 2.5 full	6.6056.252
867 pH module	2.867.0010
800 Dosino	2.800.0010
Dosing unit, 10 mL	6.3032.210
Cable USB A- mini DIN 8 pin	6.2151.000
Electrode cable 2 m / F	6.2104.030
Electrode cable 2 m, 2 x 2 mm	6.2104.150
Combined NO_3-ISE	6.00510.120
Temperature sensor Pt1000	6.1110.100

Solutions

ISA	$c(Al_2(SO_4)_3)$ = 0.1 mol/L 66.6 g aluminum sulfate octadeca-hydrate is weighed into a 1 L volumetric flask, dissolved in approx. 500 mL deionized water and filled to the mark with deionized water.

Analysis of samples

2 mL ISA is added to 50 mL sample and the direct measurement is carried out. In between each measurement the electrode is conditioned for 30 s in $c(KNO_3)$ = 0.01 mol/L and then well rinsed with deionized water.

Parameters

Mode	MEAS Conc
Signal drift	0.2 mV/min
Min. waiting time	10 s
Max. waiting time	300 s
Measuring interval	2.0 s
Stirring rate	8

Result

Sample	$\beta(NO_3^-)$ in mg/L, n = 3
Sample 1	32.1 (s_w = 3.4%)
Sample 2	11.66 (s_w = 0.11%)

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