Nitrate Sensor for the Direct and Continuous Monitoring of Nitrate in Waste Waters.

A short Report

Recent results in our laboratory have shown that the ELAS Nitrate Electrode is the only one that can be used for the direct and continuous monitoring of Nitrate in Waste Water treatment plants.

The direct monitoring of Nitrate in Waste Waters is a very difficult task due to the following serious problems:

1 The activity of Nitrate is found at relatively low levels in comparison with the commonly interfering ion of chloride.

2 Waste Water is a very complicated solution, containing various organic substances that are detrimental to the lipophilic sensing membrane of the Nitrate Sensor.

3 The selectivity of the existing Nitrate sensors over other interfering ions is very large, excluding its use to complicated solutions.

4 The signal stability of the existing Nitrate Sensors is such that it requires very frequent calibration.

5 The lifetime of the existing Nitrate Sensors is such that it does not allow the use of the Nitrate ISEs for more than a few measurements.

The results that are included in this short report provide information that prove that the ELAS Nitrate Electrode can monitor, continuously, the levels of Nitrate in wastewater for up to 12 hrs without the need of calibration. Intermittent measurements (every 5 to 10 minutes) allows for the measurement of nitrate in wastewaters for weeks or months. Under these conditions the accuracy of the measurements is in the order of +/- 1 ppm

Figure 1. Chart recording of the potential of the sensor during the measurement of 2 different wastewater in the sedimentation stage. The difference between the two samples is 20 ppm in Nitrate. Each measurement of each sample lasts for 1 hour.

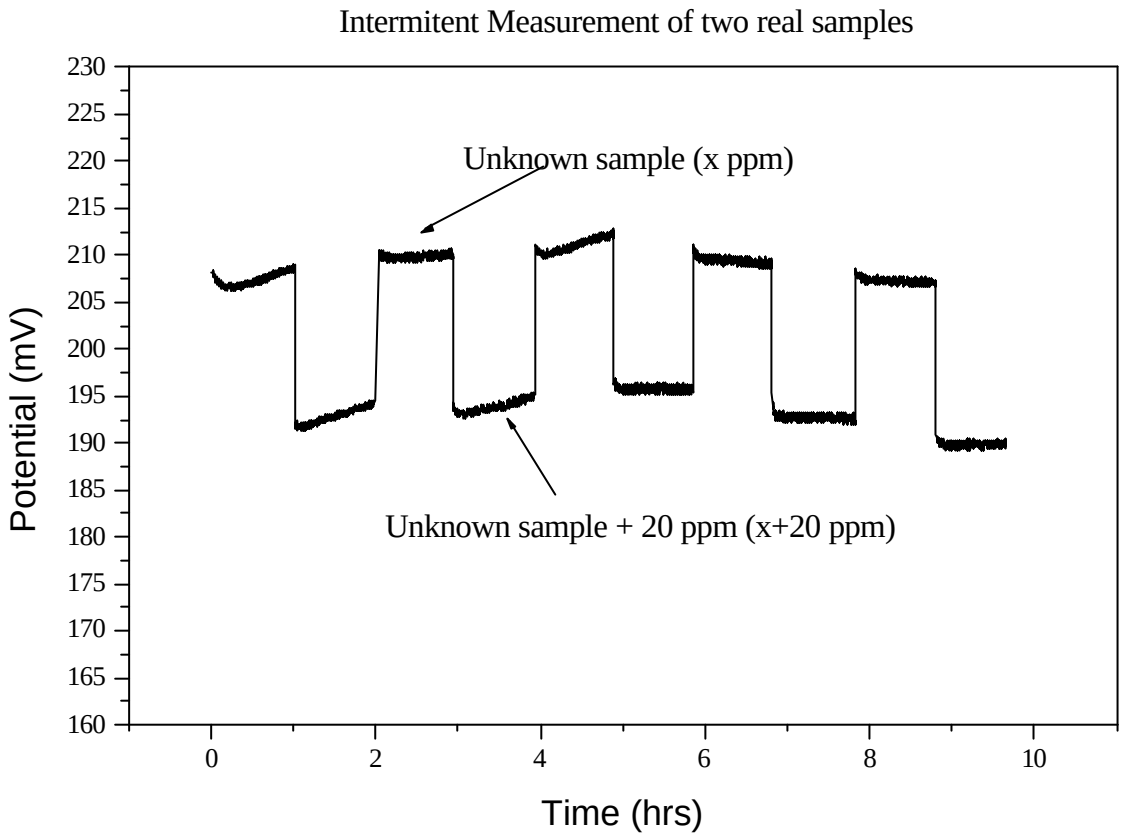


Table 1. Measurement of Nitrate in real samples. Comparison of our potentiometric sensor with other sensors and techniques

Measured ?? $_3^-$(ppm)	Our ?? $_3^-$sensor	Commercial ?? $_3^-$ sensor	Ion Chromatography.	Photometry
Sediment. Tank	8,9 ± 0,9	80,0 ± 5,1	8,3	18,93
Aeration Tank	4,6 ± 0,1	88,0 ± 0,4	4,3	-

Figure 2. Sensitivity of the nitrate sensor over time. The slope of the electrode from the calibration curve is used as a measure for the sensor stability.

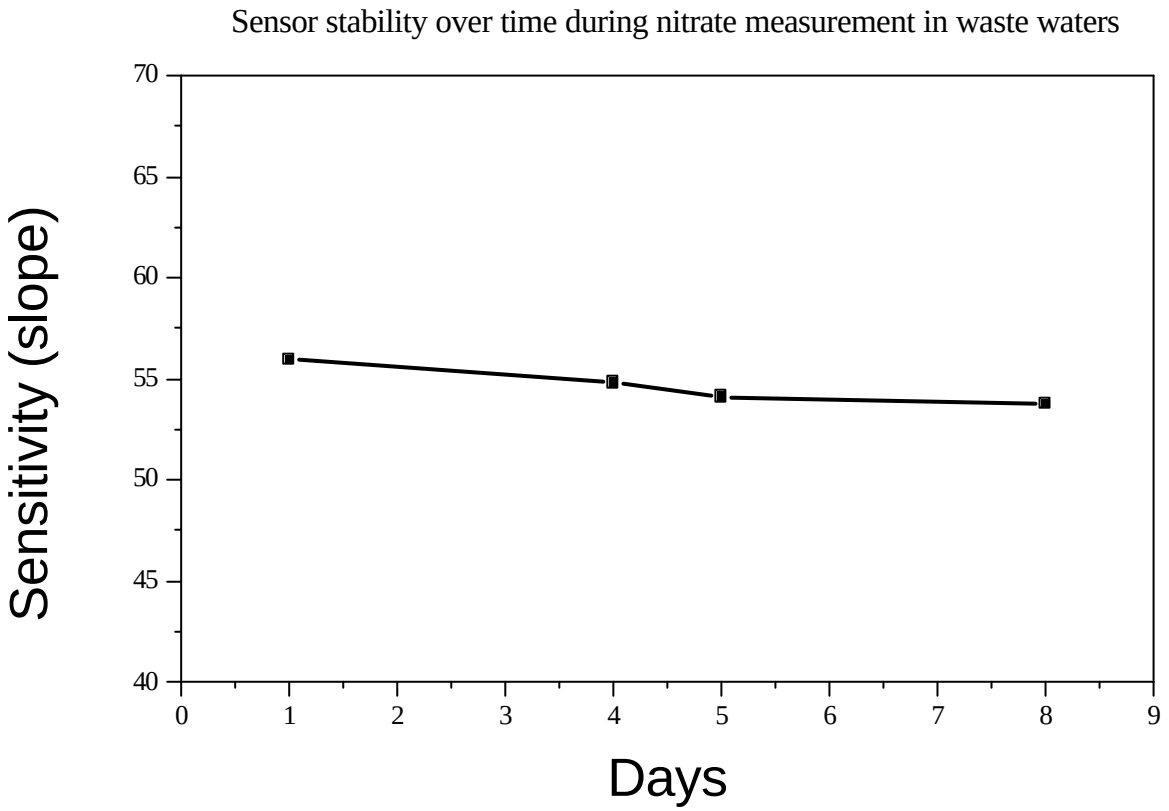
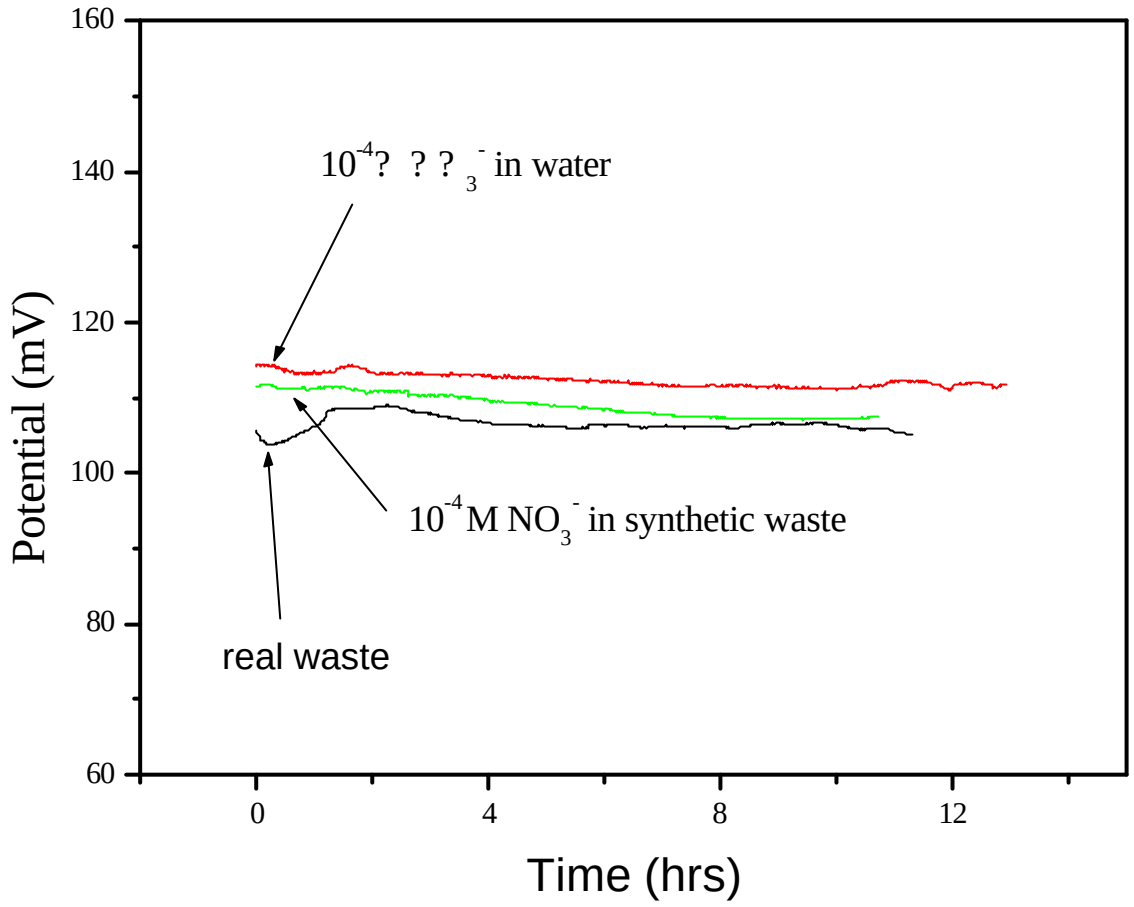


Figure 3. Signal stability of the Nitrate electrode over time,. For continuous measurement



For more information of the sensor and the results presented here, please contact us at:
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