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TECHNOLOGY NEWS
FOR PROCESS
LIQUID ANALYSIS

ECD Tech

this issue

New Manufacturing Facility for ECD

We are very pleased to announce that Electro-Chemical Devices relocated on August 1, 2009. Our new modern facility is located about 16 miles from our previous location in the city of Irvine, a technology center in Southern California. This move supports ECD's growth and technology requirements with larger expanded facilities for manufacturing, engineering and sales & marketing.

We would like to thank all of our Customers, Sales Representatives and International Distributors for helping make ECD successful, and each of you has an open invitation to visit us anytime.

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New Release- HYDRA Ammonium Sensor System

Sensor System to Monitor the Nitrification Process in an Aeration Basin

The nitrogen in sewage is present primarily as ammonium, NH_4^+, a relatively benign ion. Ammonium however coexists in a pH dependant equilibrium with ammonia, NH_3, a highly toxic chemical. A small swing in the pH of the water and it changes into a toxic soup. The standard procedure used by Waste Water Treatment Plants to remove the ammonium is a two stage process, nitrification followed by de-nitrification. Nitrification is an aerobic process where ammonium is oxidized first to nitrite, NO_2^-, then to nitrate, NO_3^-, again a relatively benign ion. The nitrate can then be reduced to nitrogen gas in an anaerobic reaction that is harmlessly released to the atmosphere.

The HYDRA Ammonium Sensor is designed to monitor the nutrient load (NH_4^+) directly in the aeration basin. The HYDRA uses ISE technology to measure the ammonium, potassium and pH. Compensation for the pH dependant concentration equilibrium and potassium ion interference on the ammonium electrode are preformed automatically in the HYDRA C22 analyzer. The sensor uses a compressed air spray cleaner to keep the sensors clean and maintenance to a minimum. Each of the electrodes is long lived (typical 6 month life) economical and easily replaceable. Internal signal conditioners allow the sensor to be mounted hundreds of feet from the analyzer.

Save money from reduced aeration costs generated through accurately following the nitrification process with the real time measurement from the HYDRA Ammonium Analyzer. For more information and specification sheet go to our website, and choose the HYDRA.

www.ecdi.com/products/pion_series.html

ELECTRO-CHEMICAL DEVICES
www.ecdi.com

Ion Selective Electrodes aren't just for the laboratory.

Industrial Ion Selective Electrodes from ECD

ECD offers a broad array of Ion Selective Electrodes that can be used for the continuous measurement of a specific ion in solution. These electrodes are designed for use in the MVS10 and MVS17 sensor assemblies. Several different measurement technologies are utilized in the product offering, glass electrodes, pressed crystalline pellets and doped PVC membranes. The most common of these technologies is the glass electrode used in every pH electrode. Each of the sensors outputs a millivolt signal according to the Nernst equation, just like a pH electrode. Each of the sensors uses a two point calibration, just like a pH electrode and each is selective for a specific ion just like a pH electrode. The point being, Ion Selective Electrodes are as easy to use as pH electrodes.

Glass electrodes develop a potential (mV) based on the charge and size of the ion being measured. For pH measurement, it is the hydrogen ion, H^+ (+1 charge and small) and for sodium measurement, the Na^+ (+1 charge and larger than hydrogen). Since both ions have the same charge and only slightly different sizes there will be interferences if there is a high concentration of the interfering ion and a low concentration of the measured ion. These electrodes have good chemical and temperature resistance and can be used in most aqueous solutions.

The crystalline pellets are typically co-precipitations of silver salts containing the ion to be measured. These powders are compressed in high pressure dies to form hard black shiny electrodes that respond to silver ions and the incorporated ion, bromide, chloride, cyanide or sulfide. These sensors are well behaved but do require periodic cleaning using an abrasive polishing pad. Both cyanide and sulfide ions only exist at high pH values, >11 pH, below this value the ions complex with hydrogen forming HCN or HS^- which are invisible to the sensor.

The fluoride ion electrode is made of a thin wafer of a lanthanum fluoride crystal, the same material used in high end camera lenses. It responds to the fluoride ion, not hydrofluoric acid, HF, or hydroxide complexes formed above 8-8.5 pH. These electrodes have good chemical and temperature resistance and can be used in most aqueous solutions, avoid strong oxidizing solutions which will attack the silver in the pellet.

The doped PVC membranes contain an ionophore specific to the measured ion in a heavily plasticized rubbery membrane. The ionophore captures the desired ion from the solution and this changes the potential of the membrane. Ionophores work on a charge and size basis so similar sized ions interfere with the measurement. The Ammonium, Calcium/Hardness and Potassium sensors use different ionophores but all are fast and stable electrodes. These sensors have a limited temperature range and cannot be used where solvents are present.

The fluoride electrode is the most widely used, typically for waste treatment at semiconductor foundries and glass processors where hydrofluoric acid is used and needs to be removed from the effluent. The Calcium/Hardness sensor is used for water treatment, typically where lime softening is used to decrease the hardness of well water. The sulfide sensors are widely used at petrochemical refineries, sulfur is present in crude oil, to assure compliance with effluent regulations. Ammonium sensors are used in the aeration tanks of many large municipal waste water treatment plants to monitor the nutrient load.

These sensors are all suitable for continuous measurement online, if any of these ions are present in your process, feel free to contact us about providing you an Electro-Chemical Devices solution.

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What do the TRITON® TR8, Pseudomonas, TRITON® DO8, Vorticella, HYDRA and Rotifers have in common?

They are all found in a healthy, well run aeration basin.

Municipal WWTPs rely on activated sludge to clean up the sewage supplied to them. The biological component of activated sludge is a mixture of bacteria, fungi, protozoa, and rotifers. These critters break down the organic matter to CO_2, N_2 and water using both aerobic and anaerobic processes. The TRITON® DO8 dissolved oxygen sensor makes sure the oxygen concentration is correct for the process. The TRITON® TR8 turbidity analyzer makes sure the activated sludge is at a sufficient level to process the load. The HYDRA monitors the ammonium nutrient load through the nitrification process. And to keep any biological process alive, the pH must also be monitored closely using the PHS10 sensors.

After the sludge has completed its work and settled into a nice floc, the water can still contain viruses and other nasties. Chlorine addition is monitored with the FCA-22 to sanitize the water and then dechlorinated with the TCA-22 before returning to the environment.