

Always ready: capillary ion chromatography at the University of Manchester

Fast results with less waste

The Analytical Geochemistry Unit at the University of Manchester receives 4,000–5,000 samples a year for analysis. It needed an ion chromatography (IC) system that could generate results quickly while producing less waste.

The Analytical Geochemistry Unit (AGU) in the School of Earth and Environmental Sciences (SEES) at the University of Manchester analyzes many different aqueous samples. The majority of these samples are microcosms—representations of real-world environments in a glass bottle. Ingredients may include real or synthetic groundwater; bacterial cultures; bacterial nutrient broth; electron donors such as lactate and/or acetate; electron acceptors such as nitrate, sulfate, or uranium. Analytes of interest include lactate, acetate, nitrite, nitrate, sulfate, phosphate and glycerol-phosphate.

“Our capillary IC system is usually analyzing samples day and night. The one day a month that it is not analyzing samples is when I change the water for the mobile phase (eluent) and re-equilibrate the system.”



Alastair D. Bewsher, Senior Analytical Technician in the School of Earth and Environmental Sciences

Alastair D. Bewsher is a Senior Analytical Technician in the School of Earth and Environmental Sciences. He uses a Thermo Scientific™ Dionex™ Capillary HPIC™ system equipped with **Thermo Scientific™ Dionex™ IonPac™ AS11-HC-4µm IC columns** for analyzing anions and organic acids.

The lab chose a capillary ion chromatography system because they needed to generate sample results quickly while also reducing waste.

Capillary IC allows column size, injection volumes, and flow rates to be scaled down by a factor of 25 to 100. Additionally, the system can operate 24/7, minimizing both calibration and equilibration times. The capillary IC system in the AGU runs samples day and night, including running unattended analyses on weekends, increasing the lab's productivity by 400%.

The laboratory does not spend time on error-prone, manual preparation of eluents. They use a feature called Reagent-Free Ion Chromatography-Eluent Generation (RFIC-EG™), which automatically produces high-purity eluents. The only routine reagent needed is deionized water. By automating eluent preparation, RFIC-EG improves method reproducibility. Additionally, the lower flow rate required with capillary IC systems significantly reduces eluent consumption and produces less waste in the laboratory. The laboratory uses the Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software for calculating peak areas and other data analysis. “The Chromeleon CDS software is very user friendly,” Mr. Bewsher says. “It's intuitive and straightforward to use.”

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