



Determination of Anions and Organic Acids in Process and Overhead Water Using Sequential Suppression with Conductivity Detection and MISP

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Process and Overhead water monitoring is important to industries such as petrochemical, paper milling, and semiconductor. The monitoring of anions and organic acids in process water establishes how effective a purification procedure is for that type of water. In overhead water, the presence of these same anions and organic acids could be an indication of scaling within the piping system.

Experimental Conditions

A Metrohm Advanced Ion Chromatography system equipped with a Metrohm Model 818 IC Pump, Metrohm 819 IC Detector, Metrohm 820 Separation Center, Metrohm 833 Liquid Handling Unit for suppressor solution delivery, Metrohm 853 CO₂ Suppressor, Metrohm 838 Advanced Autosampler in-line dilution and filtration, and a 830 IC interface for control was used for the analysis. Data acquisition and processing were performed with Metrohm IC-Net 2.3 software. The temperature was controlled using the installed column oven and set at 320 °C. The column employed for analysis was the Metrosep ASUPP7 (250mm × 4 mm) fitted with an RP guard column. The Eluent used was 3.0 mM sodium carbonate at a flow rate of 0.7 mL/min. The injection volume was 20 µL.

Results and Discussion

Suppressed conductivity detection with in line sample preparation such as dilution and filtration was used in the development of this method. Samples were placed in autosampler vials and the instrument was programmed to do an initial dilution of 1:5. The diluent was then filtered online before injection onto the analytical column. The instrument was calibrated from 0.5 to 5 ppm for each ion of interest. A linear fit was used with a corresponding R² value of 0.999 and a %RSD of < 5 for each component. Two separate samples were used for the analysis. The black trace is a process water sample and the red trace is an overhead water sample. The example chromatogram demonstrates the precision that can be achieved using the Metrohm solution to the analysis.

Conclusion

Suppressed ion chromatography is a well established and accepted technique for the determination of anions and organic acids in the environmental market place. Many other industries are also now recognizing the power of this technique for the analysis of anions and organic acids. MISP (Metrohm Inline Sample Preparation) is also becoming recognized as a powerful tool available to many laboratories in these industries. This tool allows users the flexibility of in-line sample preparation. Utilization of the Metrohm 838 Advanced Sample Processor allows laboratories to combine tedious sample preparation steps such as dilution and filtration. This combination of steps reduces the overall time required for the analysis. The time savings to the laboratory leads to increased throughput and overall laboratory efficiency.

References

- (1) Metrohm Application Works AW-US6-0116-032006.

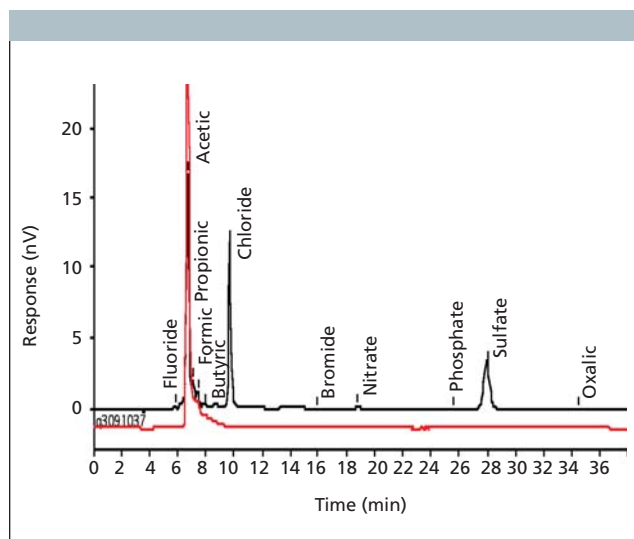


Figure 1: Stacked chromatogram of process and overhead water 2 separate samples. B = Process Water, R = Overhead Water.

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