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J.P. Romano
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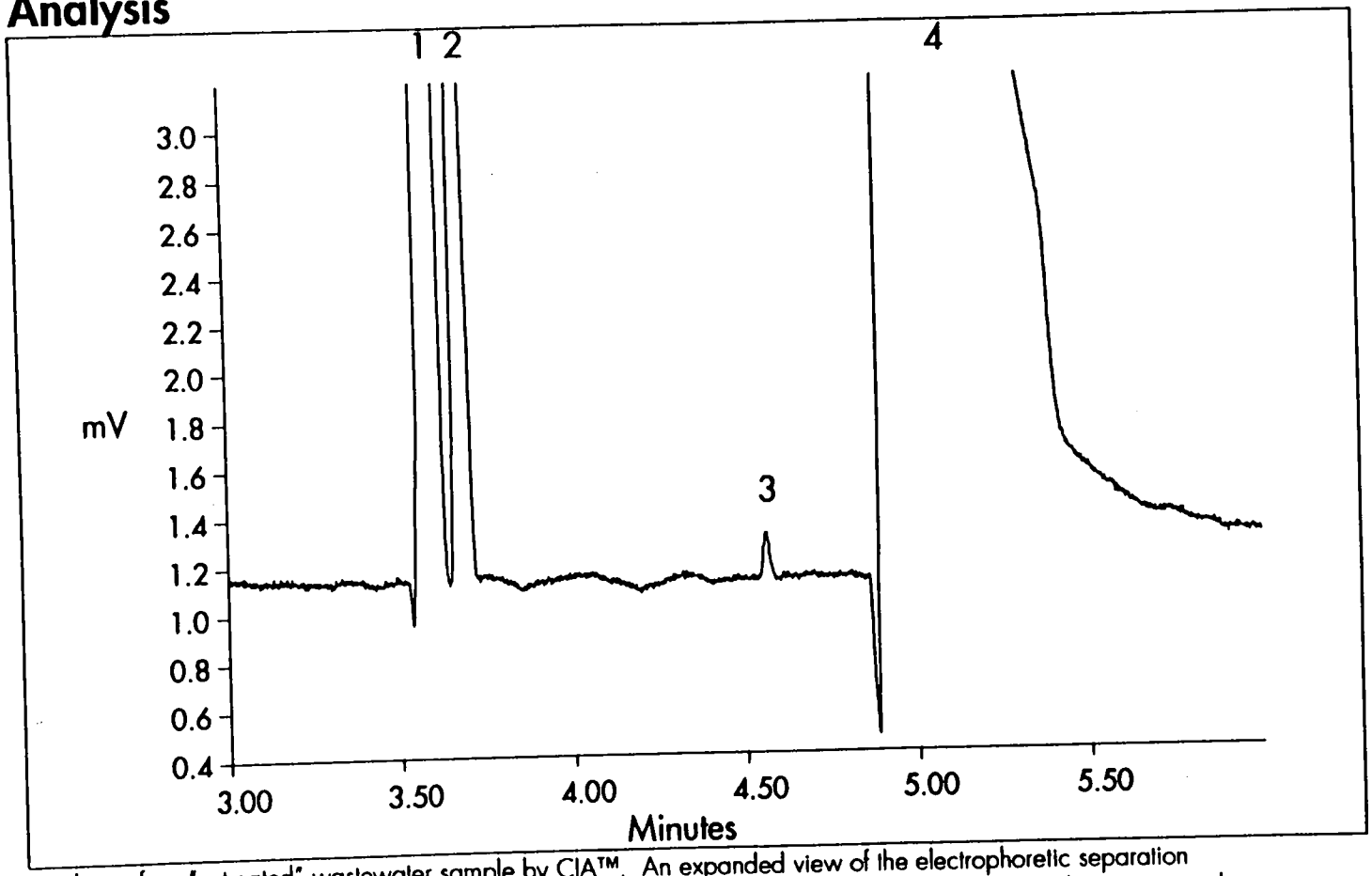
High Sensitivity Fluoride Analysis in Wastewater using Capillary Ion Analysis



Analysis of an "untreated" wastewater sample by CIA™. An expanded view of the electrophoretic separation shows an easily detected fluoride peak. Fluoride was not detected by ion chromatography (IC) in the same sample even after sample pretreatment with a Millitrap™ H^+ membrane cartridge.

Conditions:

Sample: Industrial Wastewater

Capillary: AccuSep™ 75 µm x 60 cm fused silica

Electrolyte: 4 mM chromate, 0.3 mM CIA-Pak™ OFM anion-BT, pH 8.1

Potential: 15KV (negative) at 11 µA

Detection: 254 nm (indirect UV)

Injection: Hydrostatic Mode (10 cm for 30 seconds)

Sample Preparation: Neat, filtered

Peak ID's:	Concentration
1. Chloride	83.0 ppm
2. Sulfate	23.1 ppm
3. Fluoride	0.13 ppm
4. Carbonate	not quantitated

Objective:

To demonstrate the ability of capillary ion analysis (CIA™) to analyze primary and secondary inorganic anion contaminants listed by the EPA in water.

Details:

Acquisition Rate: 20 points/second
Detector Time Constant: 0.1 seconds

CIA is a powerful separation technique which offers many advantages for the analysis of inorganic and organic acid anions in aqueous matrices. Rapid, highly efficient separations with different selectivities compared to ion chromatography are obtained. The matrix independent separation requires minimal sample preparation. Only nanoliters of sample volume and small amounts of electrolyte are needed to perform the analysis. This low reagent consumption minimizes the waste that is produced. The instrumentation is simple with low maintenance and very economical to operate. More important the capillary is not a chemical product and is a fraction of the cost of an IC column.

System:

Waters Quanta™ 4000 and Waters 860 Data Station.

References:

Romano, J. P., and Krol, J., "Capillary Ion Electrophoresis: An Environmental Method for the Determination of Anions in Water", Journal of Chromatography, International Ion Chromatography Symposium Volume. Issue to be released June 93.