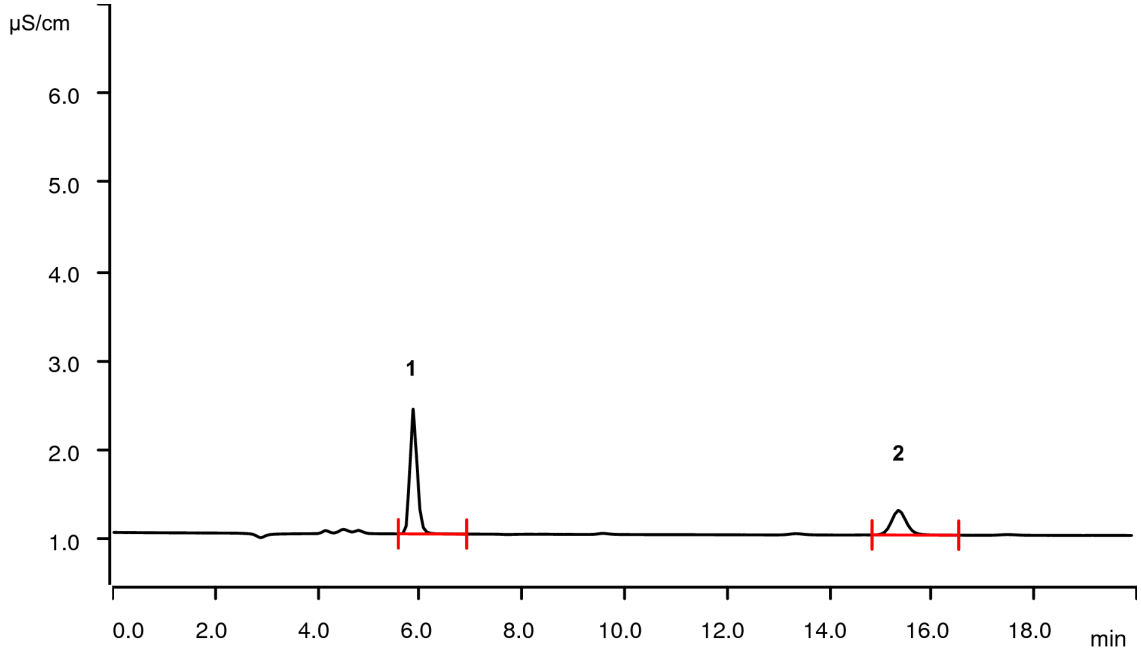
IC Application Note S–394

Anions in sodium hydrogen carbonate

Determination of chloride and sulfate contamination in high-purity sodium hydrogen carbonate applying Inline Neutralization with CO_2 suppression prior to injection.



Chromatogram of a sodium hydrogen carbonate solution.

Analysis of sodium hydrogen carbonate (also known as sodium bicarbonate) for anionic contaminants is critical due the large amount of CO_2 formed during suppression. Even applying sequential suppression does not completely remove the interferences due to the carbonate peak. The introduction of Inline Neutralization applying the Sample Preparation Module (SPM) with subsequent CO_2 removal with the MCS (Metrohm CO_2 Suppressor) prior to the injection solves the problem. After this pretreatment, the sequentially suppressed sample is analyzed without issues.

Results

	Anion	Concentration [mg/kg]	RSD [%]
1	Chloride	3.37	0.52
2	Sulfate	23.35	0.63

Metrohm

Sample

High-purity sodium hydrogen carbonate.

Sample preparation

1 g of sample is dissolved in 40 g of ultrapure water. 20 µL of this solution is loaded onto a preconcentration column after Inline Neutralization with subsequent CO_2 suppression.

Columns

Metrosep A Supp 5 - 150/4.6	6.1006.520
Metrosep A Supp 5 Guard/5.0	6.1006.500
Metrosep A PCC 2 HC/4.0	6.1006.340

Instrumentation

940 Professional IC Vario ONE/SeS/Prep 3	2.940.1430
IC Conductivity Detector	2.850.9010
942 Extension Module Vario SES/PP	2.942.0500
858 Professional Sample Processor	2.858.0030
2 x 800 Dosino	2.800.0010
MSM Rotor A	6.2832.000
MSM-HC Rotor A	6.2822.000
Adapter sleeve for Suppressor Vario	6.2834.020
IC equipment: Dosino Regeneration	6.5330.190

Analysis

Conductivity after sequential suppression

Solutions

Eluent	3.2 mmol/L sodium carbonate 1.0 mmol/L sodium hydrogen carbonate
Regenerant MSM	500 mmol/L sulfuric acid
Rinsing	STREAM
Regenerant SPM	500 mmol/L sulfuric acid
Rinsing SPM	Ultrapure water

Parameters

Flow rate	0.7 mL/min
Preconcentration volume	20 µL
P_{max}	15 MPa
Column temperature	32 °C
Recording time	20 min