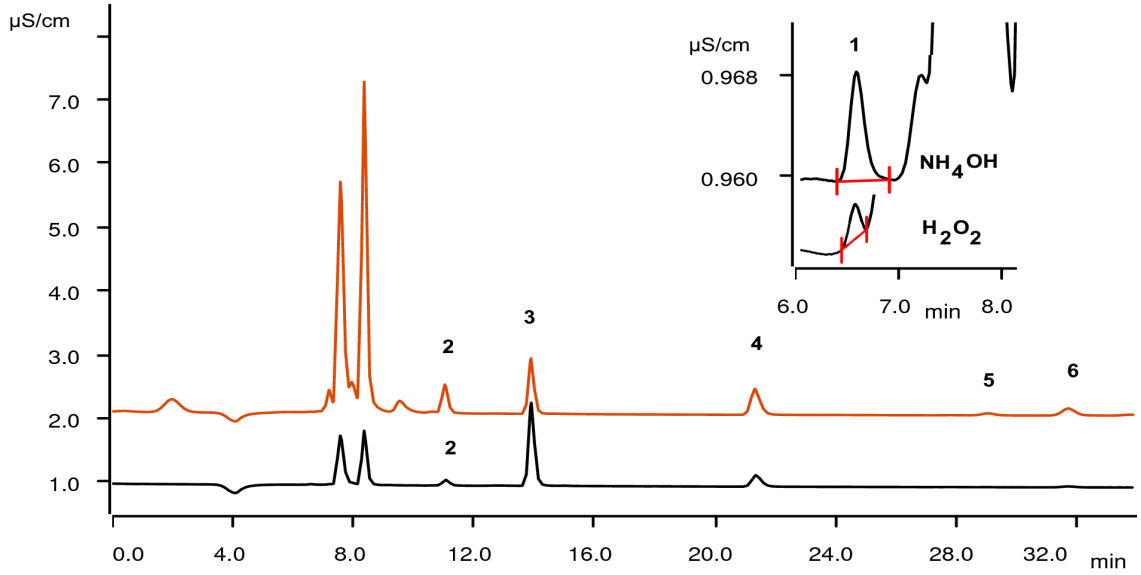
IC Application Note S–393

Anions in hydrogen peroxide and ammonium hydroxide

Separation of fluoride, chloride, nitrite, nitrate, phosphate, and sulfate in high-purity H_2O_2 and NH_4OH.



Chromatograms of ammonium hydroxide (black) and hydrogen peroxide (red). Insert: enlargement of F peaks.

The semiconductor industry requires high-purity or even ultrahigh-purity chemicals for the production of electronic components. The purity of the chemicals is crucial for the quality and efficient production of the parts. Here, hydrogen peroxide and ammonium hydroxide are analyzed applying traditional sample preparation methods like digestion and evaporation with subsequent reconstitution with ultrapure water. The received samples are injected applying intelligent Preconcentration Technique (MiPCT).

Results

	Anion	Conc. H_2O_2 [µg/L]	Conc. NH_4OH [µg/L]
1	Fluoride	0.20	0.22
2	Chloride	5.82	1.87
3	Nitrite	21.98	33.57
4	Nitrate	16.52	7.84
5	Phosphate	3.79	n.q.
6	Sulfate	5.02	0.87

n.q. = not quantified.

Metrohm

Sample

High-purity hydrogen peroxide (31%) and high-purity ammonium hydroxide (29%).

Sample preparation

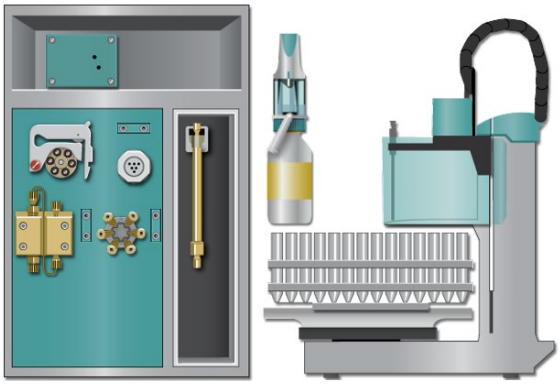
Hydrogen peroxide is treated on a platinum based crucible and reconstituted with ultrapure water. Ammonium hydroxide is evaporated and reconstituted with 4 mmol/L potassium hydroxide.

Columns

Metrosep A Supp 7 - 250/4.6	6.1006.630
Metrosep RP 2 Guard/3.5	6.1011.030
Metrosep A PCC 2 HC/4.0	6.1006.340

Instrumentation

940 Professional IC Vario ONE/SeS/PP	2.940.1500
IC Conductivity Detector	2.850.9010
858 Professional Sample Processor	2.858.0010
800 Dosino	2.800.0010
MSM Rotor A	6.2832.000
Adapter sleeve for Suppressor Vario	6.2834.020
IC equipment: MiPCT	6.5330.140



Solutions

Eluent	3.2 mmol/L sodium carbonate
Regenerant	500 mmol/L phosphoric acid
Suppressor rinsing	Ultrapure water

Parameters

Flow rate	0.7 mL/min
Preconcentration volume	1500 µL
P_{max}	15 MPa
Column temperature	45 °C
Recording time	34 min

Analysis

Conductivity after sequential suppression

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