



DETERMINATION OF INORGANIC CATIONS IN WATER SAMPLES

LUMEX Method M 01-31 (2011)

INTRODUCTION

The method allows determination of ammonium, lithium, sodium, potassium, magnesium, calcium, and strontium and barium cations in samples of natural, potable and wastewater by the capillary electrophoresis method.

MEASUREMENT METHOD

The capillary electrophoresis method for evaluation of cations concentration is based on differential migration and separation of cations in electric field due to the difference in their electrophoretic mobility. Identification and quantitative determination of the analyzed cations is performed by indirect detection measuring UV absorption at 254 nm (for "CAPEL®-103RT/104T" systems) or 267 nm (for "CAPEL®-105/105M" systems) wavelength.

MEASUREMENT RANGE

Cations	Samples	Measurement range, mg/L
Ammonium	Potable, natural and waste water	0.5–5000
Barium		0.1–10.0
Calcium		0.5–5000
Lithium		0.015–2.0
Magnesium		0.25–2500
Potassium		0.5–5000
Sodium		0.5–5000
Strontium		0.25–50.0

Injection of samples with sodium concentrations above 200 mg/L results in distortion of ammonium and potassium peaks' shapes, which, however, does not influence quantitative evaluation of their concentrations.

EQUIPMENT AND REAGENTS

The "CAPEL®" capillary electrophoresis system with high-voltage positive polarity is used in measurements. Data acquisition, collection, processing and output are performed using a personal computer running under "WINDOWS® 2000/XP" operating system with installed dedicated software package for acquisition and processing of chromatography data.

All reagents must be of analytical grade or better.

EXAMPLE OF A REAL ANALYSIS

Buffer: benzimidazole solution, with tartaric acid and 18-crown-6

Capillary: L_{EFF}/L_{TOTAL} 50/60 cm, ID 75 μ m

Injection: 150 mbar x sec

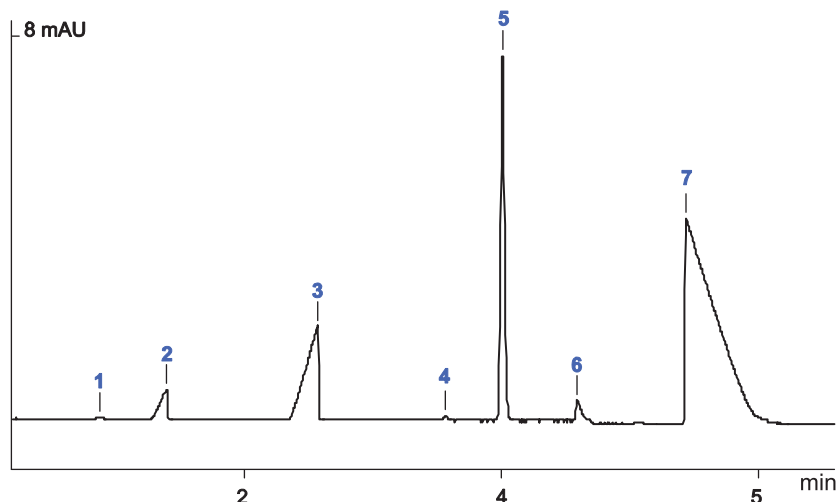
Voltage: + 25 kV

Detection: 267 nm, indirect

Sample: natural water

Measurement results:

- 1 – ammonium (0.4 mg/L)
- 2 – potassium (12.7 mg/L)
- 3 – sodium (28 mg/L)
- 4 – lithium (0.1 mg/L)
- 5 – magnesium (13.7 mg/L)
- 6 – strontium (3.5 mg/L)
- 7 – calcium (93 mg/L)



The contents on this paper are subject to change without notice.