

Analysis of Inorganic Cations by Capillary Electrophoresis with C⁴D

The eDAQ C⁴D system was used to detect the inorganic cations of potassium, calcium, sodium, magnesium and lithium, separated using capillary electrophoresis.

Introduction

The eDAQ C⁴D system was connected to a purpose-made capillary electrophoresis (CE) instrument at the University of Basel in Switzerland. The cations K⁺, Ca²⁺, Na⁺, Mg²⁺, Li⁺ were then analysed. The method used was similar to experiments previously published*.

Conditions

Sample: A solution of 10 µM of potassium, calcium, sodium, magnesium and lithium, dissolved in water.

Buffer: 12 mM histidine and 50 mM acetic acid

Instrument:

separation voltage = 30 kV
recorded separation current = 11 – 12 µA

Capillary:

fused-silica from Polymicro Technologies
outer diameter = 360 µm
internal diameter = 50 µm
length = 60 cm
length to detector = 50 cm

Injection: gravity siphoning at 10 cm for 15 seconds

C4D: frequency = 800 kHz
amplitude = 80 A
headstage gain OFF

Data recording:

lowpass Filter = 2 Hz
range = 10 mV
sampling rate = 1000 data points per second

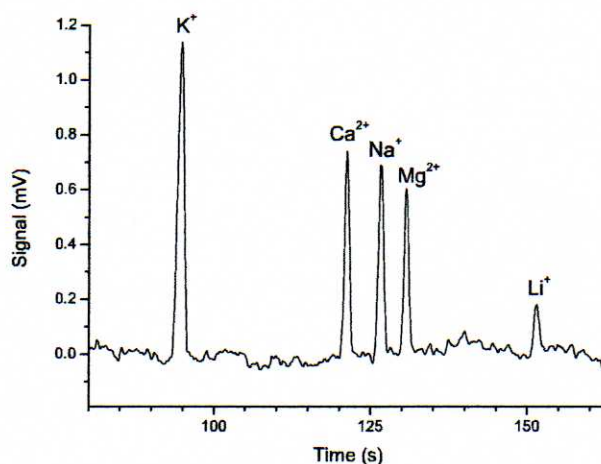


Figure 1. Electropherogram of 10 µM inorganic cations

Data and Limit of Detection

Figure 1 shows the electropherogram for the 10 µM sample of inorganic cations.

From this electropherogram, it can be estimated that the limit of quantification (LOQ) of potassium, calcium, sodium and magnesium is 1 µM, and that of lithium is 3 µM. The limit of detection (LOD) is thus 0.3 µM for potassium, calcium, sodium and magnesium, and 1 µM for lithium.

* Comparison of Different Contactless Conductivity Detectors for the Determination of Small Inorganic Ions by Capillary Electrophoresis
Pavel Kuboň, Christopher J. Evenhuis, Mirek Macka, Paul R. Haddad, Peter C. Hauser; *Electroanalysis* 18, 2006, No. 13-14, 1289 – 1296