

**Analysis of complex ionic liquid mixtures
using ion chromatography**

Poster

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AIM OF THE WORK:

- Development of analytical methods for process control in production & application of ionic liquids
- Analysis of complex mixtures containing cations and anions of typical ionic liquids
- Separation performance = f (ionic strength, organic modifier, column temperature)

EXPERIMENTAL



ICS-3000* ion chromatography system
*(Dionex Corp., CA, USA)

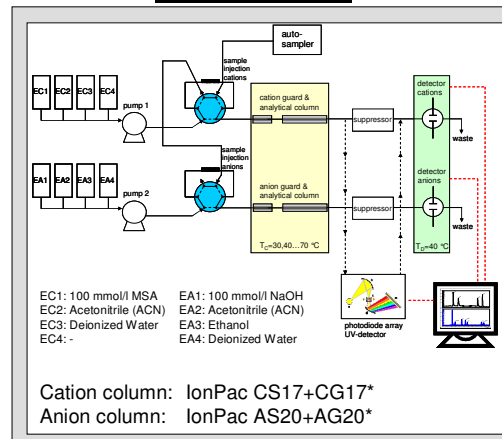
FEATURES

DUAL SYSTEM:
Analysis of IL *cations* and *anions* simultaneously from the same sample vial

GRADIENT MIXING SYSTEM:
Variable and independent *ionic* and *organic* eluent mixtures

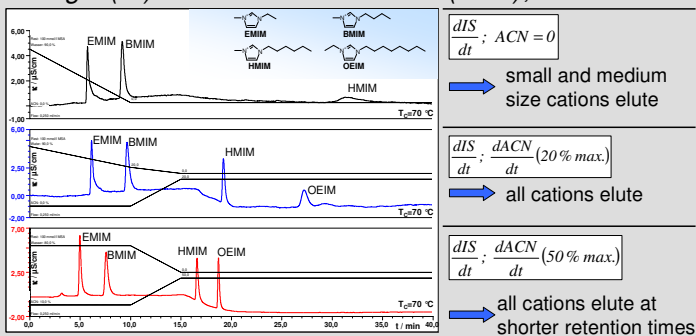
COLUMN TEMPERATURE:
Variable temperature range
 $T_C = 30 - 70 \text{ }^\circ\text{C}$

FLOW CHART



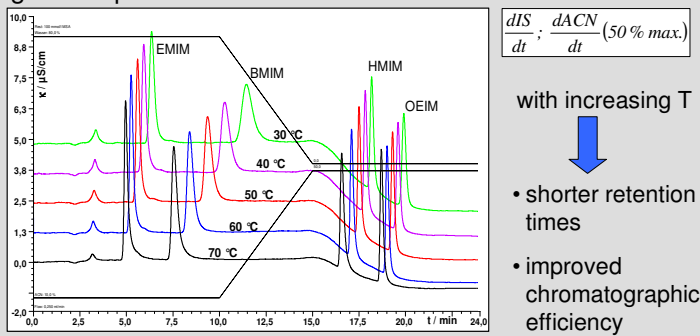
CATION ANALYSIS - ELUENT PROFILE

Influence of the elution conditions – Variation of *ionic strength (IS)* and *Acetonitrile-content (ACN)*; $T = \text{const.}$



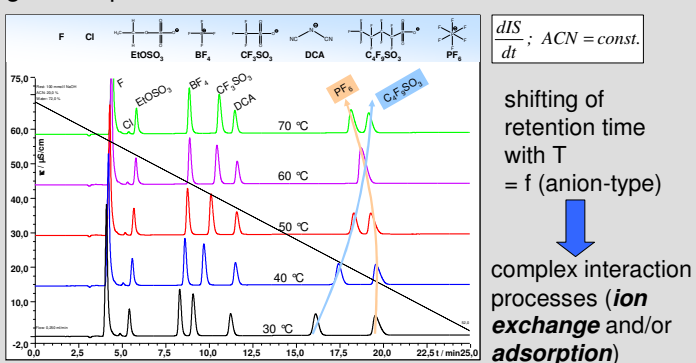
CATION ANALYSIS - TEMPERATURE

Influence of column temperature at constant eluent gradient profile



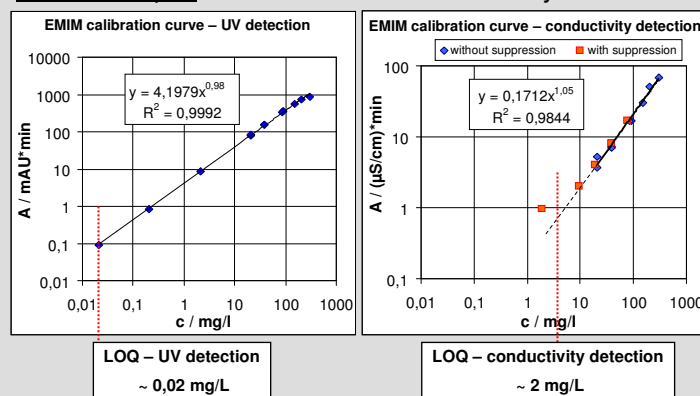
ANION ANALYSIS - TEMPERATURE

Influence of column temperature at constant eluent gradient profile



QUANTIFICATION

EMIM⁺ sample: UV detection and conductivity detection



CONCLUSION:

- Ion chromatography is an efficient and selective analytical method for the investigation of ionic liquids and complex IL-mixtures
- Gradients of ionic and organic eluent constituents combined with column temperature adjustment are used for optimal chromatographic performance

LITERATURE:

- KÖNIG, A.; WECKESSER, D.; JENSEN, D.: *GIT*, 50 (2006), No. 6, p. 546
- KÖNIG, A.; WECKESSER, D.; JENSEN, D.: *GIT*, 51 (2007), No. 1, p. 19
- WASSERSCHIED, P.; WELTON, T.: *Ionic Liquids in Synthesis.*, Wiley-VCH, 2003