

# Capillary electrophoresis with contactless conductivity detection coupled to a sequential injection analysis manifold for extended automated monitoring applications

Mai T.D., Schmid S., Muller B., Hauser P.C.

University of Basel, Department of Chemistry, Spitalstrasse 51, 4056 Basel, Switzerland; Centre for Environmental Technology and Sustainable Development (CETASD), Hanoi University of Science, Nguyen Trai Street 334, Hanoi, Viet Nam; Swiss Federal Institute of Environmental Science and Technology (EAWAG), Limnological Research Center, 6047 Kastanienbaum, Switzerland

**Abstract:** A capillary electrophoresis (CE) instrument with capacitively coupled contactless conductivity detection ( $C^4D$ ) based on a sequential injection analysis (SIA) manifold was refined. Hydrodynamic injection was implemented to avoid a sampling bias by using a split-injection device based on a needle valve for precise adjustment. For safety and reliability, the integrity of the high voltage compartment at the detection end was fully maintained by implementing flushing of the high voltage interface through the capillary. With this set-up, extended fully automated monitoring applications are possible. The system was successfully tested in the field for the determination of the concentration levels of major inorganic cations and anions in a creek over a period of 5 days. © 2010 Elsevier B.V.

**Author Keywords:** Capacitively coupled contactless conductivity detection; Capillary electrophoresis; Inorganic cations and anions; Sequential injection analysis

**Index Keywords:** Automated monitoring; Capacitively coupled contactless conductivity detection; Concentration levels; Contactless conductivity detection; High voltage; Hydrodynamic injection; Inorganic cations; Sequential injection analysis; Capillary electrophoresis; Positive ions; Sampling; Electrochemistry; anion; cation; article; automation; capillary electrophoresis; controlled study; electric potential; environmental monitoring; hydrodynamics; priority journal; process design; reliability; reproducibility; sequential injection analysis

Year: 2010

Source title: *Analytica Chimica Acta*

Volume: 665

Issue: 1

Page : 1-6

Cited by: 1

Link: [Scopus Link](#)

Correspondence Address: Hauser, P.C.; University of Basel, Department of Chemistry, Spitalstrasse 51, 4056 Basel, Switzerland; email: [Peter.Hauser@unibas.ch](mailto:Peter.Hauser@unibas.ch)

ISSN: 32670

CODEN: ACACA

DOI: 10.1016/j.aca.2010.03.014

Language of Original Document: English

Abbreviated Source Title: *Analytica Chimica Acta*

Document Type: Article

Source: Scopus

Authors with affiliations:

- Mai, T.D., University of Basel, Department of Chemistry, Spitalstrasse 51, 4056 Basel, Switzerland, Centre for Environmental Technology and Sustainable Development (CETASD), Hanoi University of Science, Nguyen Trai Street 334, Hanoi, Viet Nam
- Schmid, S., University of Basel, Department of Chemistry, Spitalstrasse 51, 4056 Basel, Switzerland
- Müller, B., Swiss Federal Institute of Environmental Science and Technology (EAWAG), Limnological Research Center, 6047 Kastanienbaum, Switzerland
- Hauser, P.C., University of Basel, Department of Chemistry, Spitalstrasse 51, 4056 Basel, Switzerland

References:

- Kubáň, P., Hauser, P.C., (2008) *Anal. Chim. Acta*, 607, pp. 15-29
- Kubáň, P., Hauser, P.C., (2009) *Electrophoresis*, 30, pp. 176-188
- Kappes, T., Galliker, B., Schwarz, M.A., Hauser, P.C., (2001) *Trends Anal. Chem.*, 20, pp. 133-139
- Kubáň, P., Nguyen, H.T.A., Macka, M., Haddad, P.R., Hauser, P.C., (2007) *Electroanalysis*, 19, pp. 2059-2065
- Hutchinson, J.P., Johns, C., Breadmore, M.C., Hilder, E.F., Guijt, R.M., Lennard, C., Dicoski, G., Haddad, P.R., (2008) *Electrophoresis*, 29, pp. 4593-4602
- Arce, L., Ríos, A., Valcárcel, M., (1997) *J. Chromatogr. A*, 791, pp. 279-287
- Sirén, H., Kokkonen, R., Hiissa, T., Särme, T., Rimpinen, O., Laitinen, R., (2000) *J. Chromatogr. A*, 895, pp. 189-196
- Kubáň, P., Karlberg, B., (2009) *Anal. Chim. Acta*, 648, pp. 129-145
- Kubáň, P., Karlberg, B., Kubáň, V., (2002) *J. Chromatogr. A*, 964, pp. 227-241
- Sprung, C., Siren, H., Rovio, S., Tyopponen, T., (2008) *Sep. Sci. Technol.*, 43, pp. 3856-3872
- Kubáň, P., Reinhardt, M., Müller, B., Hauser, P.C., (2004) *J. Environ. Monit.*, 6, pp. 169-174
- Wu, C.-H., Scampavia, L., Ruzicka, J., (2002) *Analyst*, 127, pp. 898-905
- Wu, C.H., Scampavia, L., Ruzicka, J., (2003) *Analyst*, 128, pp. 1123-1130
- Kulka, S., Quintás, G., Lendl, B., (2006) *Analyst*, 131, pp. 739-744
- Horstkotte, B., Elsholz, O., Martín, V.C., (2007) *Int. J. Environ. Anal. Chem.*, 87, pp. 797-811
- Horstkotte, B., Elsholz, O., Martín, V.C., (2008) *Talanta*, 76, pp. 72-79
- Zacharis, C.K., Tempels, F.W.A., Theodoridis, G.A., Voulgaropoulos, A.N., Underberg, W.J.M., Somsen, G.W., de Jong, G.J., (2006) *J. Chromatogr. A*, 1132, pp. 297-303
- Wuersig, A., Kubáň, P., Khaloo, S.S., Hauser, P.C., (2006) *Analyst*, 131, pp. 944-949
- Kubáň, P., Engström, A., Olsson, J.C., Thorsén, G., Tryzell, R., Karlberg, B., (1997) *Anal. Chim. Acta*, 337, pp. 117-124
- Zhang, L., Khaloo, S.S., Kubáň, P., Hauser, P.C., (2006) *Meas. Sci. Technol.*, 17, pp. 3317-3322
- Kubáň, P., Kubáň, P., Kubáň, V., (2002) *Electrophoresis*, 23, pp. 3725-3734

Download: 0176.pdf