

Publication

Automated dual capillary electrophoresis system with hydrodynamic injection for the concurrent determination of cations and anions

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 2827213**Author(s)** Thi Thanh Thuy Pham; Thanh Duc Mai; Thanh Dam Nguyen; Saiz, Jorge; Hung Viet Pham; Hauser, Peter C.**Author(s) at UniBasel** [Hauser, Peter C.](#) ;**Year** 2014**Title** Automated dual capillary electrophoresis system with hydrodynamic injection for the concurrent determination of cations and anions**Journal** Analytica chimica acta**Volume** 841**Pages / Article-Number** 77-83**Keywords** Dual-capillary electrophoresis, Capacitively coupled contactless conductivity detection (C4D), Simultaneous separations, Cations, Anions

The capillary electrophoresis instrument developed for the concurrent determination of cations and anions features two separate capillaries and individual detectors to allow independent optimization for each group of ions. The capillaries are joined in a common injector block. The sample is drawn into the injector with a small membrane pump and automated simultaneous injection into both capillaries is achieved by pressurization of the fluid with compressed air. Flushing of the injector and of the capillaries with the background electrolyte is also carried out automatically by the same means. The buffer consisted of 12 mM histidine and 2 mM 18-crown-6 adjusted to pH 4 with acetic acid and was suitable for the contactless conductivity detection employed. The system was optimized for the determination of cationic NH_4^+ and anionic NO_3^- and NO_2^- , and linear calibration curves from about 20 mM up to about 1.5 mM were obtained for these ions. In a test run over 8 h, the reproducibility for the peak areas was within $\pm 7\%$. For demonstration, the instrument was successfully applied to the concurrent monitoring of the concentrations of the three ions during the biological removal of ammonium from contaminated groundwater in a sequencing batch reactor, where NO_3^- and NO_2^- are formed as intermediate products. (C) 2014 Elsevier B. V. All rights reserved.

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