

液体クロマトグラフィーに用いる新吸光度検出法の開発

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Development of New Photometric Detection Methods for Liquid Chromatography

Research Project

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04557102

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Allocation Type

Single-year Grants

Research Field

Physical pharmacy

Research Institution

Kanazawa University

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Keywords

differential photometric detection / indirect photometric detection ion chromatography / inter-eluent separation factor / polyvalent base / differential chromatogram method / polarized photometric detection / polarizer / flow cell

Research Abstract

(1) Indirect Photometric Detection : Hoover's model was proved theoretically with a new function, "inter-eluent separation factor". The resultant equation was useful for the prediction of retention times and peak intensities of analytes as well as system peaks. Addition of polyvalent bases such as triethylenetetramine (Trien) selectively reduced the retention time of sulfate ion. This effect was estimated theoretically according to complex formation mechanism between sulfate ion and polyvalent base. A preconcentration/indirect photometric detection ion chromatograph determined inorganic and organic anions simultaneously in ranges from 10^{-9} to 10^{-7} M levels. The problem of large base-line drift observed in indirect photometric detection ion chromatography with stepwise elution was removed effectively by the differential chromatogram method. This technique was also useful for single column ion chromatography using conductivity detection.

(2) Polarized Photometric Detection : The theoretical equation was obtained for the polarized photometric detection. According to this theory, two different flow cells, single cell having longer light pass length and inner diameter than those of conventional absorbance detector flow cell and split cell having two parallel flow cells were made. Although the detection limit was improved by the former cell, the ghost signal caused by refractive index effect was not negligible. The latter cell improved the detection limit without the above problem and was useful in the gradient elution system.

Research Products (20 results)

All Other

All Publications (20 results)

- [Publications] Kazuichi Hayakawa: "Preconcentration/Ion Chromatography with Indirect Photometric Detection for Anions" Anal.Sci.9. 419-421 (1993) ▼
- [Publications] Atsushi Yamamoto: "Adsorption Isotherm of Undissociated Eluent Acid and Its Relation to the Retention of System Peak in Non-suppressed Ion Chromatography" J.Chromatogr.644. 183-187 (1993) ▼
- [Publications] Kazuichi Hayakawa: "Theoretical Consideration on Polarized Photometric Detection" Biomed.Chromatogr.in press. ▼
- [Publications] Atsushi Yamamoto: "Enantiomeric Purity Determination by HPLC with Coupled Polarized Photometric/UV Detector" J.Chromatogr.(in press). ▼
- [Publications] Masayuki Nishimura: "Ion Chromatographic Study of Sulfate-triethylenetetramine Complexes in Aqueous Solution" Anal.Sci.(in press). ▼
- [Publications] 宮崎元一: "総説:イオンクロマトグラフィーの公衆衛生関連領域への展開" 北陸公衛誌. 19. 1-7 (1992) ▼
- [Publications] 宮崎元一: "総説:イオンクロマトグラフィー-吸光度検出法の活用-その1概論" 温泉科学. 42. 89-95 (1992) ▼
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- [Publications] Atsushi Yamamoto, Akinobu Matsunaga, Eiichi Mizukami, Kazuichi Hayakawa, Motoichi Miyazaki: "Adsorption Isotherm of Undissociated Eluent Acid and Its Relation to the Retention of System Peak in Non-suppressed Ion Chromatography" J.Chromatogr.644. 183-187 (1993) ▼
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[Publications] Motoichi Miyazaki: "Application of Ion Chromatography to Public Health Science Field" Hokuriku Journal of Public Health. 19(1). 1-7 (1992) ▼

[Publications] Motoichi Miyazaki: "Ion Chromatography Use of Photometric Detection - 1 -" Onsenkagaku. 42(2). 89-95 (1992) ▼

[Publications] Kazuichi Hayakawa, Kyoko Nomura, Motoichi Miyazaki: "Ion Chromatography of Carbonate-Carbon" Bunseki. 1993(5). 375-378 (1993) ▼

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[Publications] Kazuichi Hayakawa: Sampling/Sample Preparation and Pretreatment Techniques for Analytical Methods. Gijyutsujoho-kyoukai, (1993) ▼

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