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ONLINE ISSN : 1348-2246

PRINT ISSN : 0910-6340

## Analytical Sciences

Vol. 26 (2010) , No. 7 p.737

[\[PDF \(527K\)\]](#) [\[References\]](#)**Analytical Conditions and Separation Performance of Capillary Chromatography Based on the Tube Radial Distribution of Aqueous–Organic Mixture Carrier Solvents under Laminar-Flow Conditions**[Naoya JINNO<sup>1\)</sup>](#), [Mari MURAKAMI<sup>1\)</sup>](#), [Masahiko HASHIMOTO<sup>1\)</sup>](#) and [Kazuhiko TSUKAGOSHI<sup>1\)</sup>](#)*1) Department of Chemical Engineering and Materials Science, Faculty of Science and Engineering, Doshisha University***(Received February 27, 2010)****(Accepted May 21, 2010)**

We have developed a capillary chromatography system using an open capillary tube made of fused-silica, polyethylene, or poly(tetrafluoroethylene), and a water–hydrophilic–hydrophobic organic mixture carrier solution. This tube radial distribution chromatography (TRDC) system works under laminar-flow conditions. In this study, the following analytical conditions in the TRDC system using a fused-silica capillary tube and a water–acetonitrile–ethyl acetate mixture carrier solution were for the first time examined: tube temperature, 5 – 25°C; tube inner diameter, 50 – 250 μm; tube effective length, 100 – 200 cm; and flow rate, 0.2 – 1.5 μL min<sup>-1</sup>. For example, the effects of temperature on the separation performance in the TRDC system were observed with an organic solvent-rich carrier solution; 1-naphthol and 2,6-naphthalenedisulfonic acid in a model mixture were eluted with baseline separation over the temperature range of 5 – 23°C. The resolution, theoretical plate number, and height equivalent to the theoretical plate were calculated from the experimental data obtained by examining the effects of the tube length. A mixture of 1-naphthol, Eosin Y, 1-naphthalenesulfonic acid, 2,6-naphthalenedisulfonic acid, and 1,3,6-naphthalenetrisulfonic acid was subjected to the present TRDC system, and the analytes in the mixture solution were eluted in this order with the organic solvent-rich carrier solution, providing good separation performance on the chromatogram.

To cite this article:

Naoya JINNO, Mari MURAKAMI, Masahiko HASHIMOTO and Kazuhiko TSUKAGOSHI, *Anal. Sci.*, Vol. 26, p.737, (2010) .

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doi:10.2116/analsci.26.737

JOI JST.JSTAGE/analsci/26.737

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