

Visakha Chunhakorn 2011: Monolithic Materials for Microfluidic System.
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Chemistry. Thesis Advisor: Associate Professor Orapin Chienthavorn, Ph.D.
102 pages.

A C₈-silica monolith was synthesized in a microchannel of PDMS chip, with channels length of 10 and 20 cm to be used as an analytical column for reversed phase liquid chromatography. Separation of mixture amines, namely methylamine, ethylamine, and trimethylamine, was studied with pre-derivatisation technique using 4-(2-aminoethylamino)-7-(N,N-dimethylsulfamoyl) benzofurazan fluorescing agent, which gave an emission wavelength of 518 nm. Because of high backpressure occurred in the microfluidic chip; the flow rate was limited to 0.3-0.5 mL min⁻¹. Three amines gave well resolved peaks with retention time of 2.5084, 3.0315, and 3.7355 min when using methanol as a mobile phase. The C₈-silica monolith in the channel was also studied for a separation of riboflavin and of chlorpheniramine in a channel length of 20 cm. Calibrations curves of riboflavin and chlorpheniramine were linear in a range of 200-1000 ppm, giving a linear least square of 0.9944 and 0.9274, respectively. The detection limit of riboflavin and chlorpheniramine determined from peak area were 285 and 283, respectively. Riboflavin and chlorpheniramine in tablets were tested for the feasibility for real sample analysis by an injection of the methanolic extract of a tablet of each compound into the system. The C₈-monolith microfluidic chip was proved to be a new version of HPLC column for both ionisable and neutral compounds. Benefits of the microchip are low cost, handy and disposable.

Student's signature

Thesis Advisor's signature

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