

New mixed-mode methacrylate-based polymeric monoliths prepared via complexation with β -cyclodextrin employed as stationary phases for capillary electrochromatography and μ -LC

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New mixed-mode monolithic stationary phases for chromatographic separation (CEC and μ -LC) employing solubilization by complexation with β -cyclodextrin were synthesized. Free radical copolymerization was performed in aqueous solution with a cyclodextrin-solubilized hydrophobic monomer, a water-soluble crosslinker (piperazinediacrylamide), and a charged monomer (vinylsulfonic acid). Different hydrophobic methacrylate monomers (isobornyl, adamantyl, cyclohexyl, and phenyl methacrylate) were investigated. Chromatographic properties of the synthesized monoliths were studied with aqueous and nonaqueous mobile phases with hydrophobic and hydrophilic analytes. Due to the amphiphilic nature of the polymers synthesized, the elution orders obtained correspond to the RP mode and to the normal-phase mode dependent on the polarity of the mobile phase. However, observations made with polar solutes and polar mobile phase can only be explained by a mixed-mode retention mechanism. The influence of the total monomer concentration (%T) on the chromatographic properties and on the specific permeability was elucidated. Run-to-run, day-to-day, and capillary-to-capillary reproducibility of electroosmotic mobility and retention factors were determined. Comparison of retention data with those of a commercial octadecyl silica gel HPLC column reveals that the methylene selectivity of the monolithic capillaries prepared in this study is very similar to that of routinely used octadecyl silica gels.

Biography

Fuad Al-Rimawi has completed his Ph.D. at the age of 31 years from Philipps University of Marburg in Germany and worked for more than 6 years in pharmaceutical companies in Research and Development department. He is Assistant Professor in Analytical chemistry at Al-Quds University in Palestine since 2008. He has published more than 22 papers in reputed journals and serving as a referee and an editorial board member of repute.

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