P311

THE DEVELOPMENT OF MICRO-PARTICULATE CELLULOSE-BASED PACKING MATERIALS AND THE EVALUATION OF THEIR POTENTIAL USE IN CAPILLARY CHROMATOGRAPHY

A. Maruska (1) U. Pyell * (2)

(1) Kaunas University of Technology Dept. of Organic Technology
Radvilenu 19LT-3028 Kaunas LITHUANIA

(2) Philipps-Universität Marburg FB Chemie Hans-Meerwein Str.
D-35032 Marburg GERMANY

The main focus in capillary electrochromatography (CEC) has been concentrated on silica-based packing materials and considerable progress was gained in the application of these materials for isolation and quantitation of analytes in complex mixtures. Expanding the range of stationary phases employed in CEC, we are describing here our experience attained in the development of rigid cellulose-based micro-beads, their physico-chemical modification and their use in CEC.
The formation method of a porous cellulose matrix for the column liquid chromatography of biopreparations [1] was modified in order to form microparticulate cellulose beads. The particles sizing apparatus described by Hjerten [2] was utilized to obtain a narrow fraction of cellulose particles with particle diameters ranging from 10-20 µm. The mechanical stability of the particles was increased by shrinkage of the cellulose hydrogel in organic solvents or by drying by means of a spray dryer. The shrinkage of the cellulose matrix was irreversible due to additional hydrogen bonds occurring between cellulose macromolecules during the process of the transformation of the hydrogel into xerogel. This modification process increased the mechanical stability of the cellulose matrix considerably (the elasticity of the modified cellulose decreased about 200-fold).
the shrunken particles (5-10 µm fraction were chemically modified with epichlorhydrin. the epoxy-activated cellulose was alkylated with octadecylalkohol. The octadecylated cellulose was packed into fused silica capillaries (I.D. = 100-150 µm). The electrochromatographic properties of the packed capillaries were evaluated.

[1] J. Liesiene et al., SU Pat. 1151549 (1985)
[2] S. Hjerten, High-performance agarose-based chromatographic media and their application in biopolymer separation, in M. T. W. Hearn (editor), HPLC of proteins, peptides and polynucleotides, VCH, New York, (1991) 119