Abstract

Liquid crystals are widely used in electronics, medicine and other fields. Analytical separations are important in the development of new liquid crystals to control the purity of synthesized substances. The sample analysis is important for detection of impurities formed during synthesis and for determination of chiral purity of the substance.

Liquid crystal-forming substances cannot be separated by capillary zone electrophoresis due to the absence of readily ionizable groups. Electrokinetic chromatography is a method in which a suitable surfactant is added to the background electrolyte. The uncharged substances then interact with the electrically charged surfactant to obtain an effective charge. Separation can occur if they interact differently with the added surfactant. Another problem complicating the analysis is the very low solubility of analytes in water. Separations in this work were therefore carried out under non-aqueous conditions in acetonitrile.

However, under these conditions a poor repeatability of the migration times of the substances was observed. Therefore, capillaries with differently coated inner walls were used in subsequent measurements. Surface modification should improve the repeatability of migration times. Several types of capillary coating have been tested. Dynamic coating was tested first - the capillary was flushed with an aqueous solution of hydroxyethylcellulose before a series of measurements. Subsequently, the effect of flushing before each measurement was tested. Capillary permanently coated with polybrene and commercial permanently coated capillaries have also been tested.

Based on measured EOF repeatability appropriate measurement conditions were chosen. Samples were analyzed in acetonitrile with addition of hexadecyltrimethylammonium chloride at a concentration of 40 mM and acetic acid at 10 mM concentration. The silica capillary was flushed with 1 M hydrochloric acid for 3 minutes before each measurement. It was possible to separate impurities from synthesized analytes in some samples.

Key words: liquid crystals, non-aqueous capillary electrophoresis, elektrokinetic chromatography, electroosmotic flow