Abstract

Capillary zone electrophoresis was used for chiral separation of eleven diquat derivatives. These N-heteroaromatic dications containing structural motif of 2,2´-bipyridine have recently been studied for their interesting electrochemical properties as well as for the axial chirality of their molecules. The combination of these properties could potencially lead to interesting applications in the future. For enantioseparation of diquats (DQ) commercially available randomly sulfated α-, β-, and γ-cyclodextrins with high degree of substitution were used. A succesfull chiral separation was achieved using all of the three sulfated cyclodextrins as chiral selectors (CS). Baseline enantioseparation was achieved for 82 %, 91 % respectively 100 % of the analyzed DQ in the presence of HS-α-CD, HS-β-CD, HS-γ-CD respectively. The highest separation efficiency and resolution were obtained in the backround electrolyte containing 22 mmol/L NaOH, 35 mmol/L H_3PO_4 (pH2,5) and 6 mmol/L HS-β-CD. Using three available nonracemic DQ an identification of the particular *M*- and *P*-enantiomers was done for the three corresponding DQ structures.

Apparent stabillity constants of complexes of the DQ derivatives with above mentioned cyclodextrins as CS were determined by means of capillary affinity electrophoresis. The stability constant calculations were based on nonlinear regression analysis of experimentally obtained plot of the effective electrophoretic mobillity of DQ against the concentration of given anionic CS added to the backround electrolyte. Migration times of the enantiomer-CS complexes were corrected using Haarhoff-Van der Linde function. The DQ derivatives formed strong complexes with all three types of sulfated cyclodextrins as CS. The determined stability constants varied in the range of $7,8 \cdot 10^3$ and $547,4 \cdot 10^3$ dm^3/mol.

Key words: chiral separation, sulfated cyclodextrins, capillary electrophoresis, stability constants, diquats