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Title of thesis: The influence of experimental conditions on chiral separation of borane clusters in capillary electrophoresis

Keywords: chiral separation, borane clusters, capillary electrophoresis, cyclodextrins

Abstract:

Boron compounds also include borane clusters, in which boron atoms form triangular configuration and 30 such sides are presented as a so-called cage. These clusters can be synthetically modified into various forms (open or closed) and can be substituted, for example by carbon atoms. This substitution can lead to the asymmetry of these molecules and thus to their chirality. Currently, their potential is also being studied in medicinal chemistry, where they could contribute to the design of new drugs. For instance, while they are being tested as HIV inhibitors, for boron neutron capture therapy, as CA IX inhibitors, they have also been suitable as part of hydrophobic pharmacophores in the design of drugs targeting the binding sites of various receptors.

The task of this thesis is to test the influence of experimental conditions on the chiral separation of selected molecules in capillary zone electrophoresis. The aim is to use an unmodified capillary and to test native and modified cyclodextrins as possible chiral selectors. Chiral separation of molecules dicarba-7,8-*nido*-undecaborates and cobalt bis(dicarbollides) were tested. Composition of the background electrolyte, which affects the results of analysis, were also investigated. We managed to separate some molecules of the nido-carboranes using native α -CD, moreover we succeeded to optimize the length of analysis with acetonitrile. Cobalt bis(dicarbollides) with two hydroxyl groups in their molecule were separated using derivatized β -CD. We failed to separate the zwitterionic analyte.