

ABSTRACT

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Title of thesis: The use of HPLC in the field of chiral separations VIII.

Carboranes are highly stable, hydrophobic, inorganic compounds that are based on an icosahedral structure composed of boron atoms. Some carborane representatives are chiral, which is mainly due to asymmetric substitution. The establishment of reliable and rapid methods to enable the separation of the enantiomers is necessary, which is important for their future use in practice. The high-performance liquid chromatography method is advantageous for practical application as it is widely used, robust, and applicable to a large range of fields.

The aim of this work was to test the behavior of chiral carboranes on polysaccharide columns in HPLC. First, screening was performed by gradient method using six chiral polysaccharide-based stationary phases, the component A of the mobile phase was 50 mmol/l NaClO₄, and the component B was ACN or MeOH. Subsequently, the method was converted to isocratic elution. The purpose of this study was to optimize the conditions to create a database of separations that can be used for a further study of the behavior of these compounds. Parameters of the optimized method included the column temperature and NaClO₄ concentration.

This resulted in the separation of 44 analytes at baseline of a total of 63. The 7,8-dicarbonyl-undecaborate anions remain a tough challenge, and baseline resolution was achieved for only one analyte. Representatives of zwitterions were generally better separated on the amylose column (*tris*(3,5-dimethylphenylcarbamate), compared to anions. Cobalt bis(dicarbonyl) anions were better separated on cellulose columns.