

Abstract:

In this diploma thesis a detailed investigation of the step-by-step reduction mechanism of *cone*-mono-, di-, tri and tetranitrocalix[4]arenes (in non-aqueous DMF) is presented. The intramolecular interaction of reducible (and reduced) centers and its consequences for the geometry of the starting molecule was discussed including the character of radicalic intermediates and their spin state.

It was found, that the electrochemically generated radical anions of nitrogroups (unlike their starting electroneutral state) can act as ligands. Therefore, a study of complex formation equilibria of *cone*-tetranitrocalix[4]arenes with alkali metal cations followed.

The possible use of a „stereoelectrochemical“ approach (the relationship between geometry or conformation of the molecule and its electrochemical data) was demonstrated in describing and explaining conformational and electrochemical differences between two isomeric dinitrocalix[4]arenes.

Finally, a new series of *1,3-alt*-tetranitrothiacalix[4]arenes was electrochemically characterized and compared with the “classic” calixarene derivatives.

Key words: electrochemistry, calixarenes, stereochemistry