

Title: Synthesis of 1,4-phosphonic and phosphinic acid derivatives of cyclen

Author: Bc. Jiří Bárta

Department: Department of Inorganic Chemistry, Faculty of Science

Supervisor: Doc. RNDr. Jan Kotek, Ph.D.

Supervisor's e-mail adress: modrej@natur.cuni.cz

Abstract

This thesis is focused on synthesis of diphosphonic and diphosphinic derivatives of cyclen at 1,4 positions as potential MRI contrast agents. Preparation of 1,4-dibenzylcyclen was optimized in a gramme scale for synthesis of derivatives mentioned above. 1,4-dibenzyl-7,10-bis(diethylphosphonomethyl)cyclen was prepared in a gramme scale. It's fully hydrolyzed and monoester forms were prepared. 1,4-bis(diethylphosphonomethyl)cyclen was synthesized. It's fully hydrolyzed and monoester forms were synthesized. 1,4-dibenzyl-7,10-bis(phosphinomethyl)cyclen was synthesized. The carboxylic function in ester form was attached on diesterphosphonic derivative of cyclen. Altogether 8 derivatives in positions 1,4 and 7,10 of cyclen was prepared, mostly in a gramme scale and with a high yield. All compounds were characterized by NMR and MS.

Key words: cyclen, phosphonate, phosphinate, sythesis, MRI