Abstract

The aim of this thesis was to prepare monoamide of macrocycle H_3NOTA, which was prepared by multiple step synthesis. Ligand was characterized by NMR, MS and X-ray difraction analysis. Acid-base properties were studied by potentiometric titrations. Four protonation constants pK_a`s were found and these protonation constants are lower than p$K_a$`s of H_3NOTA. Coordination properties with selected metal ions from the first row of transition metal, metal ions of biological interest and with lithium ions were investigated by potentiometric titration. Stability constants show that monoethylamide derivative of macrocycle H_3NOTA forms complexes with lower stability than diethylamide derivative of macrocycle H_3NOTA. Stability constants for complexes which contains amide group are lower than for H_3NOTA complexes. Kinetics of Ga^{3+} complexation was investigated at different pH by ^{71}Ga NMR. The rate constants of and half-lives of complexation were determined at pH = 1. The rate constant was higher and the half-life of complexation was shorter than for H_3NOTA ligand.

Key words: macrocyclic complexes, thermodynamic stability, formation kinetics, radiopharmaceutical