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**SYNTHESIS AND COMPLEXING PROPERTIES OF SELECTED MACROCYCLIC LIGANDS BUILT
ON THE BASE OF CYCLOTRIPHOSPHAZENE RING**

The aim of my Ph.D. dissertation was the synthesis and investigation of the complexing properties of new ligands group obtained by the modification of two reactive macrocyclic crown ether precursors with chlorine substituted cyclotriphosphazene derivative incorporated into the polyether ring.

The modification was connected with the replacing of chlorine atoms of the parent compound with cyclic secondary amines - piperidine or morpholine.

The investigation of the complexing properties of the ligands resulting from the presented nucleophilic reaction was mainly based on the determination of their stability constants with silver (I) ions by direct potentiometric method. The way of binding of the selected cation by the ligands was designated by applying NMR techniques. Stability constants were determined in two solvents - acetonitrile and methanol.

Moreover, in the presented work the stability constants of the complexes of mono crown ether derivative, containing in their structure the four piperidinyl substituents, with Ca^{2+} , Cd^{2+} , Cu^{2+} and Pb^{2+} cations in methanol were determined by indirect potentiometric method. These studies were designed to check whether the ligand will have a higher affinity for the cation other than silver ion. Due to obtain lower values of stability constants for the selected metals ions, this type of measurements was not performed for the other three derivatives.

For both mono crown derivatives the composition of the investigated ligands as well as their different coordination forms with the selected cations were confirmed by ESI-MS measurements. Furthermore, by applying the ESI-MS/MS spectrometry, the fragmentation mechanism for the uncomplexed ligand and each of the obtained complexes were determined in order to evaluate their stability.

The presented work also includes NMR studies on establishing how the binding of silver (I) ions by so called bridged ligands with sulphur atoms occurs.