

ABSTRACT

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Title of Thesis	Synthesis of azaphthalocyanines with photophysical properties sensitive to metal cations

Azaphthalocyanines (AzaPc) are macrocyclic planar compounds with interesting photophysical and photochemical properties. They usually absorb light over 650 nm and possess high quantum yields of fluorescence and singlet oxygen. However, we have recently demonstrated that introduction of one alkylamino group on the AzaPc periphery decreases quantum yields to zero due to *intramolecular charge transfer* (ICT). This property was used in the diploma thesis for design of a fluorescence sensor for metal cations. Detection of cations is based on blocking donor for ICT *via* its coordination to metal cation leading to restoration of fluorescence. The structure of intended AzaPc was designed to have six bulky *tert*-butylsulfanyl groups as an antiaggregation part and 1-aza-15-crown-5 moiety, which is suitable for coordination (detection) of sodium and potassium ions.

Nucleophilic substitution was used for the synthesis of appropriately 5,6-disubstituted pyrazine-2,3-dicarbonitriles (A and B), precursors of AzaPc. Mixture of magnesium AzaPc congeners was then obtained by their statistical condensation (in ratio 3:1). Removal of magnesium ion by *p*-toluenesulfonic acid and isolation of required congener AAAB by chromatographic methods gave metal free AzaPc. Zinc and magnesium was then coordinated into its center leading to final unsymmetrical zinc and magnesium AzaPcs.

Sensitivity of final AzaPcs to sodium and potassium ions was tested by photophysical methods. Fluorescence intensity increased 1.5 times in comparison to a free form. The great advantage of prepared AzaPc is the emission at longer wavelengths (671 nm) in comparison with commercially available sensors.