ABSTRACT

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Title of Thesis **Synthesis of phenol-substituted azaphthalocyanines as fluorescent pH sensors**

Azaphtalocyanines (AzaPc) bearing suitable phenol moieties were found to be potentially useful pH sensors. In this study, we focused on expanding the series of phenol derivatives synthesized previously. The main reason of our effort was the fact, that pK_a of the previous compounds (12.5-12.7) did not fall into physiologically useful range.

Two different strategies to synthesis of precursors were developed. Synthesis of the precursor with two phenols started by benzoin condensation of *p*-anisaldehyde to obtain corresponding acyloin, which was oxidized to diketone and dealkylated. Subsequently, the substituted pyrazine was obtained by condensation of this diketone with diaminomaleonitrile (DAMN). Synthesis of precursor with one phenol began with oxidation of 4-hydroxyacetophenone to corresponding ketoaldehyde, which was used in condensation with DAMN to the pyrazine.

The mixed cyclotetramerization of mono or disubstituted pyrazine with 5,6-bis(*tert*-butylsulfanyl)pyrazine-2,3-dicarbonitrile provided the mix of congeners of the magnesium AzaPc, from which the relevant congeners were isolated by repeated column chromatography. The magnesium complexes were used for preparation of metal-free and zinc derivatives. Finally, acid-base sensing properties were evaluated by absorption and fluorescence spectrophotometry.