ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové

Department: Department of Pharmaceutical Chemistry and Pharmaceutical Analysis

Candidate: **Štefan Bednárik**

Supervisor: **doc. PharmDr. Veronika Nováková, Ph.D.**

Consultant: **PharmDr. Jiří Demuth, Ph.D.**

Diploma thesis: **Study of the effect of macrocycle on intramolecular charge transfer at phthalocyanines**

Porphyrazine derivates phthalocyanines (Pcs) and their aza-analogues (AzaPcs) have been largely investigated in number of applications due to their unique photophysical and photochemical properties. One of the investigated research areas involves intramolecular charge transfer (ICT) – deactivation of excited states. This phenomenon is a competitive pathway to fluorescence emission and requires electron donors as peripheral substituents while the macrocyclic core serves as electron acceptor. The aim of this work was to study how modifications to the Pc macrocycle will affect its electron acceptor properties and subsequently the strength of ICT. The synthesis involved preparation of suitable precursors, *i.e.* 4,5-disubstituted phthalonitriles or 5,6-disubstituted pyrazine-2,3-dicarbonitriles. It was followed by their cyclotetramerization leading to the mixture of six different congeners, from which the desired asymmetrical ABBB type macrocycle was isolated – subunit “A” contains dialkylamino donor responsible for ICT process and the part “B” tunes the electron-accepting properties of the macrocycle. Finally, each prepared Pc was characterized from the point of view of photophysical properties – the absorption and emission spectra, fluorescence and singlet oxygen quantum yields.