

ABSTRACT

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Title of Thesis Synthesis of tetrapyrazinotriazaporphyrins

Phthalocyanines are a group of planar synthetic macrocyclic molecules structurally similar to the naturally occurring porphyrinoids, which show some attractive photophysical properties. They have found many applications from which the most promising is singlet oxygen production. They are able to absorb the energy of light and transfer it to the surrounding molecules creating a highly reactive species, the most important being singlet oxygen. This can be used in photodynamic therapy which is used to destroy tumor cells, to kill microbes etc. Photodynamic therapy uses three non-toxic components: light, photosensitizer and oxygen to produce reactive oxygen species. The original aim of this work was to synthesize an aza-analogue of phthalocyanine with bulky peripheral substituents derived from camphor that could prevent the aggregation of the compound. The pyrazine precursor for cyclotetramerization was prepared by condensation reaction between diaminomaleonitrile and camphorquinone. However, an interesting side product of different color and with a slightly higher R_f than the targeted compound occurred upon cyclotetramerization of the precursor in butanol with lithium. It was characterized as tetrapyrazinotriazaporphyrine with propyl chain in the *meso*-position. Cyclotetramerization in octanol with lithium led to the similar by-product with heptyl chain in *meso*-position. The aliphatic side chain most likely originated from the solvent the reaction was carried in. The following study revealed important influence of the amount of lithium on the yield of this side product. Magnesium as the initiator did not produce this side product.