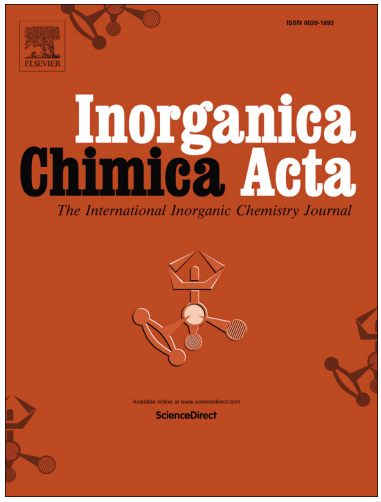

Research paper

Peripherally and non-peripherally tetra-HBME (4-hydroxybenzyl methyl ether) substituted metal-free and zinc (II) phthalocyanines: Synthesis, characterization, and investigation of photophysical and photochemical properties

Armağan Günsel, Sevde Beylik, Ahmet T. Bilgiçli, Göknur Yaşa Atmaca, Ali Erdoğmuş, M. Nilüfer Yarasir

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Peripherally and non-peripherally tetra-HBME (4-hydroxybenzyl methyl ether) substituted metal-free and zinc (Il) phthalocyanines: Synthesis, characterization, and investigation of photophysical and photochemical properties

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Abstract: This paper reports on the synthesis and characterization of non-peripherally and peripherally tetrasubstituted metal-free and zinc(II) phthalocyanines functionalized with the phenolic compound "4-hydroxybenzyl methyl ether (HBME)". Synthesized compounds have been characterized by elemental analysis, FT-IR, ^{1}H NMR, ^{13}C NMR, MALDI-MS and UV-Vis spectral data. Besides, spectral, photophysical (fluorescence quantum yields and lifetimes) and photochemical (singlet oxygen generation and photodegradation under light irradiation) properties of newly synthesized phthalocyanines were investigated in DMF solution. We obtained very high singlet oxygen quantum yields as 0.86, 0.91, suggesting its potential as photosensitizer in PDT treatment.

Keywords: Phthalocyanine, synthesis, zinc phthalocyanines, photochemistry

1. Introduction

Phthalocyanines (Pcs) containing an extensive delocalized 18 π electron system, have been used because of their unique electronic, optical and structural properties. Metal-free and metallophthalocyanines have been worthy of attention over the last few decades due to their high technological applications **[1]**. They have been used in very different areas of technology and medical applications such as gas sensor **[2]**, solar cell **[3]**, liquid crystal **[4]**, semiconductors **[5]**, electrochromism **[6]**, photodynamic therapy (PDT) of cancer **[7,8]**.