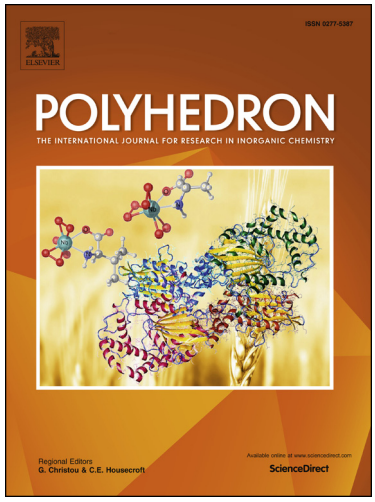

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Perchlorinated europium, terbium and lutetium mono(phthalocyaninates): synthesis, investigation of thermal stability and optical properties

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ABSTRACT

A novel hexadecachloro-substituted terbium(III) phthalocyaninate was synthesised and identified by mass-spectrometry, infrared and UV/Vis spectroscopies. Its elemental composition was proved using high resolution mass spectrometry, while thermal analysis revealed sufficiently high thermal stability up to 220 ^{o}C. For the first time for lanthanide(III) mono(phthalocyaninates), the influence of the lanthanide ion nature on the nonlinear optical properties was investigated. The values of the absorption cross-sections of the first excited state were determined using the z-scan technique. The highest value (σ_1 = 1.96 × 10^{-16} cm^2) was observed for the terbium complex.

Keywords: Phthalocyanine / Halogen / Lanthanide / Nonlinear optical properties / UV-Vis spectroscopy

1. Introduction

The presence of electron-withdrawing substituents in the peripheral and non-peripheral positions of the phthalocyanine macrocycle leads to unique physico-chemical properties, resulting in the