Emission Characteristics and Photostability of
\(N,N'-\text{Bis}(2,5\text{-di-[tert-buty]phenyl})-3,4:9,10\text{-perylenes} \text{(dicarboximide)}\)

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The titled dye (1) shows very high fluorescence quantum yield values as well as photostability. The dye undergoes molecular aggregation both in the ground state (at a critical concentration of ca. \(2 \times 10^{-4}\) mol dm\(^{-3}\)) and in the excited state (giving excimerlike emission at ca. 600 nm). It displays solvatochromism in both emission and UV-visible absorption spectra. The dye does not give laser emission upon pumping ethanolic solutions with a nitrogen laser (\(\lambda_{\text{exc}} = 337.1\) nm, peak power of 100 kW) but acts as an efficient quencher of 1,4-bis(2-pyridyl-2-vinyl)benzene (P2VB) laser dye. The quenching process obeys a static type mechanism. Equimolar mixtures of dye 1 and P2VB or 2,5-distyrylpyrazine (DSP) laser dyes also give no laser emission. With even higher peak power (200 kW, pulse duration of 800 ps) a laser emission can be obtained from chloroform solutions of dye 1.

Introduction

The synthesis and spectral identification of several highly fluorescent and very highly stable perylene derivatives have been recently reported. Dyes of such unique characteristics are very attractive in many areas, e.g., dye lasers, and solar energy conversion, and can serve as photosensitizers, photon counters, and

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