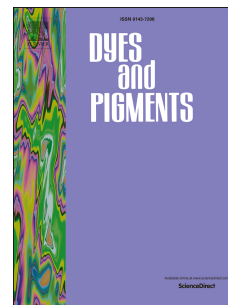


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Synthesis and spectral properties of probes based on pyrene and 2,2,6,6-tetramethylpiperidine-1-H- or 1-oxyl

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Abstract

The spectral properties of novel pyrene-piperidine/pyrene-piperidine-1-oxyl adducts with varying linkers differing in electronic conjugation between these two functionalities were investigated in solvents of different polarity. Tuning their fluorescence efficiency via structure modification is discussed in terms of increased conjugation, solvent polarity effect, main non-radiative de-excitation pathways and static/dynamic excimer or solute-solvent exciplex fluorescence. Compared to parent pyrene molecule, the main additional non-radiative de-excitation pathways leading to significant fluorescence quenching were studied using time-resolved fluorescence spectroscopy and quantum-chemical DFT (Density Functional Theory) calculations and were identified as reductive photo-induced electron transfer and intramolecular paramagnetic quenching.

Key words: pyrene, sterically hindered amines, imine linker, solute-solvent exciplex, intra- and intermolecular paramagnetic quenching, photo-induced electron transfer

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