

桥环菁染料II:1-(N-烷基-4-吡啶基)-3-(N-烷基-4-吡啶亚基)-4,5-二取代-1,4-环戊二烯菁染料的合成和质子化及荧光性质研究

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摘要 本文报道带有疏水长链的桥环菁染料的合成。并研究这类菁染料的质子化过程和平衡常数、取代效应,以及胶束、糖淀粉和环糊精对染料的可见光谱及质子化过程的影响,本文也考察了桥环菁染料的荧光光谱,这些研究在理论上和实际应用有一定意义。

关键词 [吡啶 P](#) [缩合反应](#) [环戊二烯](#) [卤代烃](#) [丙烷 P](#) [N-烷基](#) [桥环化合物](#) [荧光分光光度法](#)
[质子化作用](#) [菁染料](#) [吡啶基](#) [磷翁盐](#)

分类号 [TQ61](#)

Bridged cyanine dyes II: Synthesis of 1-(N-alkyl-4-pyridino)-3-(N-alkyl-4-pyridylene)-4,5-disubstituted cyclopenta-1,4-diene and their protonation and fluorescence spectra

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Abstract Sensitizers) 1,3-Di(4-pyridyl)propane was alkylated with benzyl bromide or n-octyl iodide to form dipyrindinium salts, which were condensed readily with α -diketones in the presence of piperidine to give bridged cyanine dyes containing hydrophobic alkyl groups. In acidic solution, the entire $^1\text{H-NMR}$ spectra of the cyanines were shifted lower in field 0.4-0.7 ppm, and the CH singlet corresponding to the fulvene ring proton of the cyanines was replaced by a 2 proton singlet at 4.25-4.70 ppm for the methylene groups of dications. A dramatic hypochromic shift and a very strong hypochromic effect in their visible spectra were observed in acidic media. The bridged cyanine dyes were protonated at the central ring to form dications with resulting loss of the cyanine conjugation. The pK_b values of the cyanines were evaluated from the pH dependence of dye absorption spectra. Substituents at the 4,5-position of the central cyclopentadiene ring greatly affected the pK_b , but the N-alkyl groups and counterion played no role on the pK_b of the cyanines. The presence of micelle, amylose, and β -cyclodextrin had very small effects on the visible absorptions and protonation processes of the cyanines. The bridged cyanines showed fluorescence emissions at ~ 600 nm with moderate fluorescence quantum yield.

Key words [PYRIDINE P](#) [CONDENSATION REACTION](#) [CYCLOPENTADIENE](#) [HALOHYDROCARBON](#)
[PROPANE P](#) [N-ALKYL GROUP](#) [BRIDGE COMPOUNDS](#) [FLUOROSPECTROPHOTOMETRY](#)
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