LUMINESCENT IONIC LIQUID CRYSTALS BASED ON STILBAZOLIUM MOIETIES

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Abstract

Liquid crystals have become pivotally important to a variety of image displaying technologies. They have drawn much attention due to their ability to confer luminescent properties to a wide spectrum of image-based devices. The purpose of this research is to describe a new methodology for an efficient synthesis of luminescent ionic liquid crystals including a discussion of their applications in the biological/medicinal sciences.

Introduction

• Rod-like Molecular Structure  • Strong Dipole
• Rigidness of the Long Axis  • Easily Polarizable Substituent

Applications

• Chemical Industry  • Solar Thermal Energy
• DNA, RNA and protein tracking  • Liquid Crystal Display

Results

Figure 1. $^1$H NMR spectrum of Compound 3.

Figure 2. Emission spectra of compounds 3, 4 and 6 when excited at 394, 386, and 392 nm, respectively, in methanol.

Figure 3. Photomicrographs of (a) compound 3 taken at 170 °C (b) compound 4 taken at 160 °C (c) compound 4 taken at 250 °C and (d) compound 6 taken at 40°C under crossed polarizers by using polarizing optical microscope (magnification 400×).

Conclusions

• Compounds 1–6 were synthesized with respectable yields
• Chemical structures were confirmed by $^1$H NMR and $^{13}$C NMR spectroscopy and elemental analyses
• Compound 3–6 showed light-emitting properties in solvents of various polarities as well as in solid states

Future Research

• Thermal analyses of compounds 3–6 will be performed.
• Their crystal structures will be investigated by X-ray analysis.
• Salts containing six stilbazolium moieties will be synthesized to broaden their application in light-emitting devices.

Scheme 1. Preparation of salts containing six stilbazolium moieties from hexakis(bromomethyl)benzene.

References


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