Synthesis and Characterization of Discotic Liquid-Crystalline Semiconductors Based on [1,3,5]-triazine.

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ABSTRACT

Compounds with liquid-crystalline properties are studied because of the wide application as information displays, also named Liquid Crystal Displays (LCDs), and widely used in many devices that are essential part of our everyday life. In particular, the liquid crystals with disk like molecular geometry (discotic liquid crystals) have a wide range of applications in molecular electronics, such as: photoconductors, OLEDs, solar photovoltaic cells and chemical sensors. The previous due to its highly organized structure, excellent charge transportation and thermal stability. Compounds with liquid-crystalline properties containing [1,3,5]-triazine structures are good candidates for using as discotic functional materials with luminescence. This self-organization can be used for orientation of charge transportation ducts, with potential application in organic electrolytes for fuel cells. In this study, it is described the synthesis and characterization of compounds based on the heterocycle tris-[1,2,4] triazol [1,3,5]-triazine (TTT), designed to obtain self-organizing liquid crystalline state. The materials were characterized by FTIR and ^{1}H and ^{13}C NMR. The thermal properties were measured by TGA (Thermogravimetric Analysis) and DSC (Differential Scanning Calorimetry). Membranes were prepared by the spincoating technique and electrochemical conductivity evaluated. The optical properties were obtained by absorption spectroscopy (UV) and fluorescence analysis. The results show great potential for application of these materials in electrolyte for fuel cells.

Keywords: discotic liquid crystals; electrical conductors; heterocycles.