Synthesis and Characterization of 2,1,3-benzothiadiazole Derivatives for Solar Cell Applications

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ABSTRACT

Over the past two decades, fluorescent organic compounds have important applications in several fields, like organic light emitting diodes (OLEDs), electro-optic devices and solar cells. Due to the low cost of manufacture and feasibility to control their properties according to their chemical structure, organic materials have more advantages comparing with inorganic materials. Organic compounds of 2,1,3-benzothiadiazole derivatives have fluorescence when combined with others compounds, for example substituted aromatic rings with alkoxy chains. The central unit in these compounds is the heterocyclic 2,1,3-benzothiadiazole; an excellent acceptor of electrons, which facilitates the intra-molecular charge transfer and consequently reducing and adjusting the band-gap of molecules in π-conjugated polymers to the visible region in the solar radiation spectrum. In this paper, we report the synthesis and characterization of compounds 2,1,3-benzothiadiazole derivatives, designed to assure molecular planarity. All the synthesized compounds were chemically characterized by spectrometric techniques as FTIR, ^{1}H NMR and ^{13}C NMR. Thermal properties were evaluated through DSC studies, optical properties were carried out by analysis of absorption spectroscopy (UV) and finally, the electrochemical properties were evaluated by measurements of cyclic voltammetry.

Keywords: fluorescence; benzothiadiazole, band-gap;