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Organic Sensitizers Containing Donor-π-Acceptor Type Anthracene for Dye Sensitized Solar Cells

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Abstract – In recent times, anthracene-based organic thin film transistors, organic light emitting devices (OLEDs), solar cells and dye sensitized solar cells can be used to due to such features achieve high efficiency effective charge excellent and carrier mobility. Electrical properties of compouns could be linked planar structure of anthracene structure, conjugated, and the crystalline. A series of new organic dyes including variety amines as electron donors, a variety of anthracene based donor-acceptor (D-A) type molecules, the following compounds: 2-(1 (5-(10-(thiophen-2-yl)anthracen-9-yl)thiophen-2-yl)ethylidene)malononitrile (An-B), and 2-(1-(5-(10-(thiophen-2-yl)anthracen-9-yl)thiophen-2-yl)ethylidene)malononitrile (An-C) were synthesized. Also, it is anticipated that anthracene derivatives with the thiophene moieties as π-bridge would demonstrate improve photovoltaic performance due to lowered LUMO energy level, higher electronic coupling constant, light harvesting efficiency and electron injection values. These dyes as the sensitizers in dye-sensitized solar cells (DSSCs) using under one sun (AM 1.5) illumination, demonstrated efficiencies ranging from 1.12% to 2.02%, exceeding that using functionalized compounds.

Keywords: dye-sensitized solar cells; power conversion efficiency; anthracene