Abstract

Conjugated poly (*p*-phenylenevinylene) (PPVs), polyfluorenes, fluorene copolymers have got great attention due to their conducting, photoluminescent and photovoltaic properties. Pure poly (p-phenylenevinylene) is insoluble and infusible and therefore difficult to process into the solid state. A general methodology to overcome this problem is to develop a route that involves a solution-processable polymer precursor. Up until now, the most widely used method for the preparation of PPV derivatives is the Gilch route. Accordingly, several new PPV derivatives were synthesized with structural modification. These are naming as BTFM-PPV, MEH/BTFM-PPV and DBTFM-PPV. Properties of the PPV derivative were tailored by structural modification through incorporation of fluorine as $-CF_3$ groups. Fluorene containing five new ter copolymer naming as P4 (thiophene / fluorene / phenylene), P5 (thiophene / fluorene / anthracene), P6 (thiophene / fluorene / pyridine), P7 (pyridine / fluorene / anthracene) and P8 (pyridine / fluorene / phenylene) were also synthesized by Suzuki protocol.

All the polymers were soluble in various organic solvents. The polymers were characterized by ^{1}H-NMR, FT-IR, gel permeation chromatography, elemental analysis, thermal, optical and electrochemical methods. Optical band gap, processability, light absorbance range, film forming ability make this polymers suitable for solar cell application. Using this polymers bilayer and bulk heterojunction (BHJ) solar cells were fabricated. The current-voltage (I-V) curves were measured in dark and under illumination from solar simulator at 100 mW cm^{-2} light intensity.

Keywords*: Poly (p-phenylenevinylene) (PPV), Fluorene, Solubility, Thermal properties, Optical properties, Electrochemical properties, Photovoltaic device.*