

CONJUGATED COPOLYMERS FLUORENE-BASED ON BENZO-THIADIAZOLE AND THIENO-THIOPHENE FOR PHOTOVOLTAIC CELLS

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ABSTRACT

Organic solar cells have been receiving more attention in the recent years due to the cost bottleneck cap of inorganic solar cells and the increasing demand for more low-cost renewable power sources. In this work, poly(9,9-didodecylfluorene-alt-benzo[c][1,2,5]thiadiazole), **P1** and poly(9,9-didodecylfluorene-alt-thieno[3,2-b]thiophene), **P2** composed of alternating fluorene based co-polymer unit were successfully prepared by direct arylation polymerization. **P1** composed of alternating fluorene unit as a donor unit and 2,1,3-benzothiadiazole as an acceptor unit which is a donor-accepter co-polymer while **P2** composed of alternating fluorene unit as a donor unit and thieno[3,2-b]thiophene as a donor unit which is a donor-donor co-polymer. The colour and phase of **P1** and **P2** were observed. TLC showed positive result for **P1** and **P2**. The surface morphology of **P1** and **P2** were identified by SEM. The structure of **P1** and **P2** were confirmed by using ¹H-NMR and ¹³C-NMR. Functional group of **P1** and **P2** were identified by using Fourier Transform Infrared Spectroscopy (FTIR). The λ_{max} and range of adsorption of **P1** and **P2** were identified and band gap were calculated. The physical characteristics of **P1** and **P2** were compared and discussed. The chemical characteristics of **P1** and **P2** were compared and discussed. **P2** has a high potential as organic material applied in organic solar cell compared to **P1** as UV-Vis shown that **P2** has a better adsorption range and lower band gap compared to **P1**.

Key Words: *Organic solar cell, fluorene based, and direct arylation*