Synthesis of fluorene based alternating copolymers using direct arylation polymerization

ABSTRACT

Many researches have been done to obtain a low band gap and high Polymeric solar cell (PSCs) polymer either by creating new polymer or revising reported polymers from previous studies. In present work, two new copolymers were synthesized through direct arylation polymerization to produce poly(9,9-didodecylfluorene-alt-benzo[c][1,2,5]thiadiazole (P1) and poly(9,9-didodecylfluorene-alt-thieno[3,2- b]thiophene) (P2). The P1 and P2 are donor-accepter copolymers. P1 and P2 were compared to investigate its suitability to be applied in PSCs. The polymers obtained were characterized using FT-IR, NMR and UV-Vis spectroscopy. P1 shows two adsorption bands at $\lambda \max 1 = 243$ nm and $\lambda \max 2 = 320$ nm, whereas P2 also shows two adsorption bands at $\lambda \max 1 = 243$ nm and $\lambda \max 2 = 427$ nm. The optical band gap was calculated, P1 enabled band gap of 3.88 eV while P2 showed band gap of 2.91 eV. This work could be provided an insight to design and synthesize more efficient fluorene-based copolymers as active layer of PSCs in due course.