

ABSTRACT

Poly[N-9'-heptadecanyl-2,7-carbazole-alt-5,5-(4',7'-di-2-thienyl-2',1',3'-benzothiadiazole)] (PCDTBT) is an attractive material for optoelectronic devices, and has been prevalently prepared by traditional couplings. Despite robust and effective, the traditional methods generally involve the use of toxic organometallic reagents. Direct arylation polymerization (DAP), as a simple, green, and cost-effective alternative to traditional coupling, has been utilized in this work to prepare an analogue of PCDTBT, namely poly[(9-hexadecyl-2,7-carbazole)-alt-(4,7-di(thiophen-2-yl)-2,1,3-benzothiadiazole)] (P1). The copolymer was obtained in 44% yield and satisfactorily characterized by Fourier-transform infrared spectroscopy (FTIR) and Nuclear magnetic resonance (NMR). UV-Vis absorption spectra showed the presence of inter-chain interaction and aggregation in the solid state. The optical bandgap of the copolymer was found to be in the range of 1.77 -1.81 eV, which is slightly lower than that of PCDTBT (1.88 eV).