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Synthesis and Photoelectrochemistry Characterization of Polymer based on 4,7-Di(thiophen-2-yl)-benzo[c][1,2,5]thiadiazole, (DTBT). LUZ MARIA LAZO JIMENEZ¹, Instituto de Ciencias Nucleares, UNAM., BERNARDO ANTONIO FRONTANA-URIBE², Centro Conjunto de Investigación en Química Sustentable, CCIQS-UNAM-UAEM. — Poly[4,7-di-(thiophen-2-yl)-benzo[c]-[1,2,5] thiadiazole], P(DTBT), is used in polymer:PCMB blends as active layer on organic photovoltaic devices, (OPV); DTBT-based copolymers show well-reversible oxidation and reduction electrochemical processes. These processes indicate their high electrochemical stability suitable for n- and p-doping. This is a typical feature benzothiadiazole containing molecules. In the present study the synthesis conditions of the monomer, 4,7-di-(thiophen-2-yl)-benzo[c]-[1,2,5]-thiadiazole based on Stille coupling reactions has been investigated and its respective polymer P(DTBT) was prepared by repetitive potential-sweep anodic oxidation of the corresponding monomer DTBT onto Pt disk or indium tin oxide (ITO) electrodes. Electrochemical cyclic voltammetry (CV) was performed to determine the HOMO and the LUMO energy levels of the conjugated DTBT and P(DTBT), both exhibit amphoteric redox properties, n- and p- doping process. The optical gap estimated from electrochemical measurements of the polymer P(DTBT) was found to be 1.77 eV, which is close to the reported band gap (1.1-1.2eV) determined by optical absorption technique. Photoelectrochemical characterization of P(DTBT) was realized from UV-Vis-NIR spectra recorded at different applied potentials. These results are correlated with the charge-transfer phenomena in the polymers applied as active layer on OPV's.

¹Av. Universidad 3000. Coyoacán, C.P. 04510. México, D.F. MEXICO

²Km 14.4 Carretera Toluca-Atlacomulco. C.P. 50200, Toluca-, Estado de México, MEXICO

Luz Maria Lazo
Instituto de Ciencias Nucleares, UNAM.

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