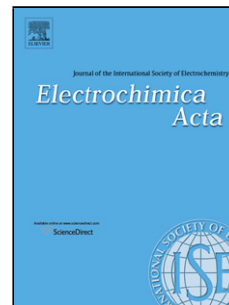


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A Low Band Gap Polymer Based on Selenophene and Benzobis(thiadiazole)

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Abstract

A new derivative of benzobis(thiadiazole) based donor–acceptor–donor type monomers, namely 4,7-di(selenophen-2-yl)benzo[1,2-c;4,5-c']bis[1,2,5]thiadiazole (SeBTSe), was synthesized and its polymerization was carried out successfully via electrochemical polymerization in an electrolyte solution of 0.1 M tetrabutylammonium hexafluorophosphate dissolved in dichloromethane. The monomer SeBTSe is a deep red chromophore and it has four redox states: one oxidation, one neutral and two reduction states. The electrochemical behaviour of the corresponding polymer called PSeBTSe was studied by cyclic and differential pulse voltammetry. There is a good agreement between electrochemical (0.62–0.66 eV) and optical (0.63 eV) bandgaps of the polymer. Like the monomer, the ambipolar polymer has four redox states and electrochromic properties: gray beige at neutral state, smoky azurite at oxidized state, beige at first reduced state and dark beige at second reduced state.

Keywords: Electropolymerization, Electrochromic, Ambipolar, Donor-Acceptor-Donor, Selenophene, Benzobis(thiadiazole)

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