

NOVEL SOLUTION-PROCESSABLE [1]BENZOTHIENO[3,2-B][1]- BENZOTHIOPHENE DERIVATIVES AS PROMISING MATERIALS FOR HIGH-PERFORMANCE ORGANIC FIELD-EFFECT TRANSISTORS

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Derivatives of [1]benzothieno[3,2-b][1]benzothiophene (BTBT) are one of the most popular types of compounds used in basic elements of organic electronics – organic field effect transistors (OFETs) with high mobility. Excellent chemical and thermal stability of the BTBT fragment allows both variation of conjugated substituents and solubilizing groups or groups contributing to the self-organization of semiconductor molecules in crystals. The high degree of planarity of molecular semiconductors and the ability to self-organize, along with high processability, allows the use of BTBT derivatives in devices with various configurations: high performance OFET, electrolyte gated OFET, organic light emitting transistors, phototransistors, etc¹. In addition to these peculiarities, it is possible to vary the position of solubilizing substituents in conjugated fragments to achieve useful properties².

Novel dithienyl derivatives of BTBT with solubilizing groups in 3, 4 or 5 positions of thienyl rings were synthesized via Suzuki cross-coupling reactions and isolated in pure form (Figure 1). The effect of the position of the alkyl substituents on the optoelectronic, thermal and electrophysical properties of these derivatives of BTBT will be presented. In addition, difunctional monomers were obtained from the compound BTBT-T-C8-3, which showed very high solubility. Thus, the work presents a route to easy processable BTBT-containing conjugated polymers, which are promising for high performance OFETs.

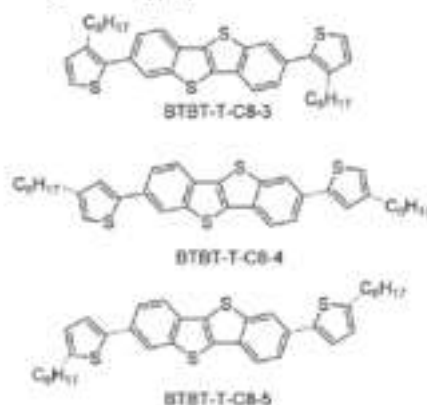


Figure 1. Novel dithienyl derivatives of BTBT

References

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