

Abstract Submitted
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Ultra-pure organic semiconductors with improved charge carrier transport properties CLARA SANTATO, Département de Génie Physique, École Polytechnique de Montréal, C.P. 6079, Succ. “Centre Ville”, Montréal, QC, Canada H3C 3A7, FABIO CICOIRA, Department of Material Science and Engineering, Cornell University, Ithaca, NY, 14853-1501 and INP - CNR Via alla Cascata 56c Povo (TN), 38050, Italy, FRANCESCA DI MARIA, MANUELA MELUCCI, GIOVANNA BARBARELLA, ISOF -CNR, Via P. Gobetti 101, 40129 Bologna, Italy — The electrical performance of devices based on organic semiconducting films depend critically on the synthesis and processing of the materials. The quality of organic semiconductors depends on synthetic conditions and purification procedures, which have not yet been optimized. Ultra-pure semiconductors permit to establish sound correlations between molecular structure, functional properties of the films and performance of devices based thereon, e.g. field-effect transistors (FETs). Understanding structure-property relationships in films is the crucial condition for predicting chemical structures with superior properties. We report on FETs based on oligothiophene that exhibit dramatically improved charge transport, due to the ultra-purity of the organic semiconductors. The latter was achieved using a synthetic methodology that takes advantage of (i) heterogeneous catalysts, (ii) microwave activation to shorten reaction times and suppress side reactions.

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