Electropolymerization and Morphologic Characterization of α-Tetrathiophene

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Résumé en anglais	In this research, poly(α-tetrathiophene), poly(α-TTP), was potentiostatic and potentiodynamically electrosynthesized on Pt and F-doped SnO2 electrodes. The solvent effect (CH2Cl2 and CH3CN) on the nucleation and growth mechanism, NGM, and morphology of the respective deposit was established by potentiostatic method and scanning electron microscopy (SEM), respectively. Potentiodynamic electropolymerization at low sweep rates proved to favor the obtention of a polymer with a more uniform morphology and, in addition, its capacitance as capacitor increased and the p-doping/undoping relationship is close to one (reversible doping). On the other hand, when potentiostatic electropolymerization was realized, deconvolution of the obtained j/t transients revealed that under all conditions, the main contribution to electrolysis at high times (greater than 20 s) was instantaneous nucleation with 3D growth. Nevertheless, the contribution of instantaneous nucleation with 2D growth is always more important in the early stages of the process. However, regardless of the conditions employed in the electropolymerization, the use of an oligomer as starting unit, such as α-TTF, affords deposits with more homogeneous morphology than when the respective monomer is used. Therefore, the information gathered in the current work constitutes a significant contribution that validates the proposed model for the electropolymerization mechanism.
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