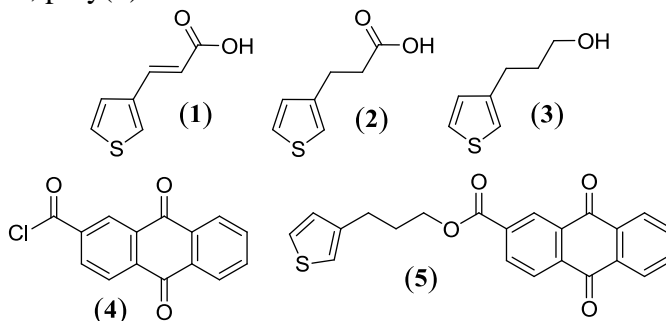


Electrochemical behaviour of polythiophene films containing anthraquinone groups

S. D. Perera*

Department of Chemistry, The Open University of Sri Lanka, Nawala, Sri Lanka

Electrochemical syntheses of conducting polythiophenes and polypyrroles received considerable attention. Unlike pyrrole based polymers, some 3-substituted polythiophene derivatives dissolve in common organic solvents. There are reports on preparation of 3-substituted polythiophene films and their applications such as field-effect transistors, chemical and biochemical sensors. 3-Substituted polythiophenes with long pendent redox groups in the polymer backbone act as electron transfer mediators. Electrodes modified with poly (pyrrole-anthraquinone) films catalyze the reduction of dioxygen. Therefore, it is of interest to examine the behaviour of its polythiophene analogue. In this communication, we report the synthesis of the monomer (**5**) and electrochemical behaviour of (**5**) and the resulting polymer, poly(**5**).



Perkin reaction of thiophene-3-carboxaldehyde with malonic acid gave 3-(3-thienyl) acrylic acid (**1**). Reduction of (**1**) with Na/Hg yielded 3-(3-thienyl) propionic acid (**2**). Further reduction of (**2**) with LiAlH₄ afforded the alcohol (**3**) as colourless oil. The acid chloride (**4**) was prepared by reacting 9,10-anthraquinone-2-carboxylic acid with thionyl chloride. The monomer (**5**) was obtained in good yield by reacting (**3**) with (**4**). Cyclic voltammetry of (**5**) showed two reversible peaks at $E^{\circ} = -0.80$ and -1.36 V. The electrochemical behaviour of poly(**5**) has been examined. These films were quite stable to repetitive scanning between 0 and -1.35 V. The neutral, hydrophobic poly(**5**) films show some resistance to swelling in acetonitrile media.

Keywords: Anthraquinone, Cyclic voltammetry, Electropolymerization, Polythiophene

*ksper@ou.ac.lk