

Photo-electrochemical sensor for dissolved oxygen, based on a poly(3,4-ethylenedioxythiophene)/iron oxalate hybrid electrode, Bencsik G, Lukacs Z, Visy C, ANALYST, 135 (2010) 375-380.

Abstract

In this work a poly(3,4-ethylenedioxythiophene) (PEDOT)/iron oxalate composite was synthesized by electrochemical polymerization. The layer was deposited potentiostatically from the monomer-containing solution in the presence of iron(II) oxalate. Similarly to the polypyrrole/iron oxalate electrode - presented in a recent paper - the layer gave a negative photocurrent, which depended on the oxygen concentration of the electrolyte. This cathodic photocurrent - taken as the differences between the values registered under illumination and in the dark at -750 mV potential on the cathodic part of the voltammetric cycles - confirmed the sensitivity of the PEDOT/iron oxalate electrode for dissolved oxygen. Stationary photocurrents were determined also from chronoamperometric measurements, and they exhibited a linear behaviour with the dissolved oxygen concentration to below 1 ppm. The photo-effect of the PEDOT/iron oxalate layer can be attributed to the excitation of the neutral form of the film.