

Organic electrochemical transistor-based advanced biosensor for clinical diagnosis

Abstract

The growing discipline of bioelectronics, which combines the fields of biology with electronics, has enormous promise for the creation of cutting-edge biomedical devices for therapeutic and diagnostic purposes. The use of organic electronic materials provides an ideal biointerface due to their reported biocompatibility, and mechanical matching between the sensor element and the biological environment. Organic electronic devices are particularly promising in this regard. The organic electrochemical transistor (OECT) is one potential technology among such devices. The ability of an OECT to provide local amplification and serve as a high-fidelity transducer of biological processes may be its most crucial attribute. The OECT also incorporates traits and qualities that can be adjusted for a variety of biological purposes. In this chapter, we discuss how the OECT's development was framed in relation to the underlying optimization for a number of applications, such as ion sensing, enzyme sensing, and electrophysiology. These uses have facilitated the development of functional OECTs that can characterize tissue, monitor the function of entire organs, and detect local ionic/biomolecular and single cell activity. The corpus of work discussed here shows that the OECT is a very adaptable tool that becomes a key factor in clinical diagnostics.

Keywords

Analytical Electrochemistry; Bioelectrochemistry; Bioelectronics; Materials Chemistry; Organic Compound; Sensor