Terry Chilcott, J Chromatogr Sep Tech 2018, Volume 9
DOI: 10.4172/2157-7064-C3-045

Terry Chilcott

University of Sydney, Australia

Interfacial impedimetric biosensor

The immersion of biosensors in body tissue samples inevitably involves the formation of interfaces with body electrolytes. The interfaces are generally viewed as nuisances to recognizances of antibodies to which nanostructures comprising the biosensor surfaces have been sensitized. This is because the interfaces can interfere with sophisticated electronic and chemical constructs comprising the biosensor substrates that transduce and amplify signals generated by targeted antibodies upon binding to complementary antigens anchored within the nanostructures. The interfacial impedimetric biosensor avoids this sophistication but uses electrical impedance spectroscopy (EIS) to characterize electrochemical and physiochemical changes in the interface where antibody-antigen bindings occur. EIS, XPS and water-contact-angle measurements were used to characterize the surfaces and interfaces that alkane nanostructures formed with 1-300 mM KCl electrolytes during the construction of the biosensor. EIS also characterized the interfaces that formed between the nanostructures and the highly doped semiconductor substrate. This confirmed the absence of the usual electric field inducing depletion layers that develop in low doped semiconductor substrates and the absence of dependencies of the interfacial properties on electrolyte concentration. Such remained the case during the construction which commenced with an undecylenic acid nanostructure and progressed through stages of surface modifications with NHS, IgG and glycine. The interfaces that formed with the electrolytes varied but in explainable ways related to thicknesses, surface coverage's and electronegativity of the modifications as well as electrolyte concentrations. The interfacial recognizance of the targeted anti-IgG was unambiguously confirmed by non-specific binding tests with anti-IgM. Future development stages will be discussed.

Biography

Terry Chilcott has specialized in Biophysics at the School of Physics, University of New South Wales (UNSW) and latter in industrial membranes at the UNESCO CMST at UNSW and presently in membrane science at the School of Chemical and Biomolecular Engineering at the University of Sydney. He is also a co-inventor of a unique impedance spectrometer commercialized by Inphaze Pty Ltd. He has some 50 publications in top international journals and some 50 peer reviewed papers delivered at international conferences.

terry.chilcott@sydney.edu.au