

Current Analytical Chemistry 2011 vol.7 N1, pages 8-34

Layer-by-layer polyelectrolyte assemblies involving DNA as a platform for DNA sensors

Evtugyn G., Hianik T.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The development of DNA-sensors has become significantly important in the past decades due to prospects of application in medicine, biotechnology and exploring fundamental problems related to cell biology and DNA functioning. Layer-by-layer (LbL) immobilization provides unique approach to the implementation of DNA into the surface sensing layers, a crucial step of DNA-sensor development. The review considers main aspects of LbL assembling in DNA-sensor development and application for the detection of complementary oligonucleotides and DNA damage assessment. Besides, electrostatic assembling due to stepwise accumulation of oppositely charged layers, various combinations of covalent binding and affine immobilization are also considered. The characteristics of DNA containing multilayers onto the solid support and the effect of the immobilization techniques and layers assembled on the performance of appropriate DNAsensors are summarized for different target analytes. © 2011 Bentham Science Publishers Ltd.

<http://dx.doi.org/10.2174/157341111793797626>

Keywords

Biosensor, DNA damaging factors, DNA hybridization, DNA-sensor, Layer-by-layer assembling, Polyelectrolytes, Self-assembled monolayers