# Graphene-Based Highly Sensitive Electrochemical Sensors for Bisphenol A

김광수, 유필진[1,*]
성균관대학교; [1]성균관대
(pjyoo@skku.edu*)

Bisphenol A (BPA) is a highly hazardous component to human since it is regarded as one of endocrine disruptors. For an analysis and removal of BPA, needs for the specific detection system with a high sensitivity and selectivity to target BPA have been continuously grown. In this study, to develop an electrochemical recombinant protein biosensor, reduced graphene oxide (RGO) thin film electrode was fabricated using layer-by-layer (LbL) self-assembly of oppositely charged graphene oxide (GO) solutions. A peptide sequence that specifically binds to BPA was prepared based on a phage-display technique, then it was inserted into terminal region of LacI protein to be afterwards utilized as a probe protein. Through a thermal denaturation process, the LacI-BPA protein was directly immobilized on the surface of RGO thin film electrode via pi-pi stacking interactions. As an impedimetric biosensor, it shows a wide linear range from 100 fM to 10 nM and the lowest detection limit of 5.0 fM to BPA. To further verify the specificity of screened peptide sequence, BPA analogues such as Bisphenol S (BPS) and Bisphenol F (BPF) were also assessed, in which the LacI-BPA protein showed much greater affinity to BPA over BPS and BPF.