

Recombinant Protein-Immobilized Graphene: A Highly Sensitive and Selective Electrode for Electrochemical Detection of Bisphenol A

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Bisphenol A (BPA) is a highly hazardous and carcinogenic compound, especially to infants. For efficient prevention of exposure to BPA, therefore, there is an urgent technological need to develop a novel detection means with high sensitivity and selectivity. To meet this goal, in the present work, we propose an electrochemical detection system based on a sensing platform comprising layer-by-layer assembled reduced graphene oxide (rGO) electrode and surface-immobilized probes of recombinant protein of Lac repressor (LacI). Electrochemical impedance spectroscopy (EIS) was conducted to confirm the feasibility of the present system as an impedimetric sensor. It showed a minimum detection limit down to 5.0 fM. To confirm the selectivity of the screened peptide sequence, BPA analogues such as Bisphenol S (BPS) and Bisphenol F (BPF) were also assessed. However, it showed negligible reactivity to these chemicals. Moreover, a practical applicability of the BPA sensor was tested from various plastics.