

Detection of phenol by incorporation of gold modified-enzyme based graphene oxide thin film with surface plasmon resonance technique

ABSTRACT

In this study, the incorporation between gold modified-tyrosinase (Tyr) enzyme based graphene oxide (GO) thin film with surface plasmon resonance (SPR) technique has been developed for the detection of phenol. SPR signal for the thin film contacted with phenol solution was monitored using SPR technique. From the SPR curve, sensitivity, full width at half maximum (FWHM), detection accuracy (DA) and signal-to-noise ratio (SNR) have been analyzed. The sensor produces a linear response for phenol up to 100 μM with sensitivity of $0.00193^\circ \mu\text{M}^{-1}$. Next, it can be observed that deionized water has the lowest FWHM, with a value of 1.87° and also the highest value of DA. Besides, the SNR of the SPR signal was proportional to the phenol concentrations. Furthermore, the surface morphology of the modified thin film after exposed with phenol solution observed using atomic force microscopy showed a lot of sharp peaks compared to the image before in contact with phenol proved the interaction between the thin film and phenol.