

Optical and structural characterization of immobilized 4-(2-pyridylazo)resorcinol in chitosan-graphene oxide composite thin film and its potential for Co²⁺ sensing using surface plasmon resonance technique

ABSTRACT

In this study, the preparation of immobilized 4-(2-pyridylazo)resorcinol (PAR) in chitosan-graphene oxide composite has been described using spin coating technique. The optical properties of the composite thin film was characterized using UV-Vis-NIR absorption spectroscopy and its optical band gap was obtained. The characterization of the composite thin film was confirmed by the Fourier transform infrared spectrum obtained and the surface morphology of the composite thin film was observed using field emission scanning electron microscope (FESEM). Lastly, the experimental SPR curves were obtained for different concentration of Co²⁺ metal ion solution to study the potential of the composite for metal sensing. The sensor produces a linear response for higher concentration of Co²⁺ with a sensitivity of 0.00069° ppm⁻¹. These results indicate that the composite thin film shows potential for the detection of Co²⁺ using surface plasmon resonance technique.

Keyword: Surface plasmon resonance; Optical properties; Chitosan; Graphene oxide; 4-(2-pyridylazo)resorcinol; Cobalt ion