

## **Structural, optical and sensing properties of ionophore doped graphene based bionanocomposite thin film**

### **ABSTRACT**

In this study, the ionophore doped graphene-based bionanocomposite solution has been prepared using valinomycin, graphene oxide and chitosan in acetic acid under mild condition. After the reaction, the ionophore doped graphene-based bionanocomposite thin film was fabricated using spin coating technique. The structural and optical properties of the bionanocomposite thin film was characterized by Fourier transform infrared spectroscopy (FTIR), atomic force microscopy (AFM) and ultraviolet-visible near infra-red (UV-vis-NIR). The functional group of the thin film has been confirmed by FTIR and surface morphology by AFM indicated that the bionanocomposite thin film is relatively smooth and homogeneous. The UV-vis-NIR analysis showed that absorption of the thin film is high with optical band gap of 3.987 eV. Also, this derivative bionanocomposite thin film has been studied as a sensor element by using surface plasmon resonance (SPR) spectroscopy. The SPR results suggested that potassium ion can be detected by integrating the thin film in the SPR system. This ionophore doped graphene-based bionanocomposite thin film has high potential as novel optical material for metal ion sensing application.

**Keyword:** Surface plasmon resonance; Optical properties; Ionophore; Graphene; Sensing; Potassium ion

