**ABSTRACT**

Conventional SPR sensors makes use of a dielectric metal configuration which finds application in the visible and near infrared region. However, it is least sensitive to mid and far infrared region. To overcome the shortcoming, graphene ribbon array are employed. Due to its unique physical, chemical and optical properties, graphene finds its application in various photonic devices and sensors. Theoretical simulation on the effect of graphene on the performance of spr based fiber optic sensor has been done. The attenuated total internal reflection method along with Krestchmann configuration has been used to analyze the sensor parameters. The influence of the number of graphene layers on the various choice of metal having particular thickness was felt in the sensor performance. The proposed optical model suits best as a bio-sensor