EuroSciCon

World Congress on

Materials Science & Engineering

August 23-25, 2018
Amsterdam, Netherlands

Nano Res Appl 2018, Volume: 4
DOI: 10.21767/2471-9838-C4-018

HIGH SENSITIVITY DETECTION BY GRATING ASSISTED SURFACE PLASMON RESONANCE SENSOR FOR IDENTIFICATION OF HAZARDOUS TOXIC CHEMICALS AND GASES

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The objective of this work is to develop and optimize the Fiber Bragg (FBG) grating based surface plasmon resonance (SPR) sensor for monitoring the hazardous toxic chemicals and gases in underground mines or any industrial area. A fully cladded telecommunication standard FBG is proposed to develop to produce surface plasmon resonance. A thin few nm gold/silver film (subject to optimization) is proposed to apply over the FBG sensing head using e-beam deposition method. Sensitivity enhancement of the sensor will be done by adding a composite nanostructured graphene oxide (GO) sensing layer using the spin coating method. Both sensor configurations supposed to demonstrate high responsiveness towards the changes in resonance wavelength. The GO enhanced sensor may show increased sensitivity of many fold compared to the gold coated traditional fibre optic sensor. Our work is focused on to optimize GO, multilayer structure and to develop fibre coating techniques that will serve well for sensitive and multifunctional detection of hazardous chemicals. This research proposal shows great potential towards future development of optical fiber sensors using readily available components such as Bragg gratings as highly sensitive chemical sensors in areas such as environmental sensing.

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