

# Development of LSPR based optical fiber sensors for the diagnosis of biomolecules

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## Abstract

Optical sensing technology is a recent and accurate measurement technology for the development of optical biosensors. Plasmonic optical sensors nowadays are employed in a plethora of applications ranging from environmental monitoring to bio (chemical) sensing. In brief, these sensors are applicable for biomedical diagnosis, drug discovery & therapies, material analysis & shaping, (bio) chemical sensing, and environmental monitoring. Plasmonics is a promising field of technology that examines the interaction between light and metallic NSs at the metal–dielectric interface. The commonly employed plasmonic-based methods such as surface plasmonic resonance (SPR) and localized SPR (LSPR). The different structures of optical fiber have been utilized to develop the biosensors. The LSPR effect in optical fiber sensors is introduced by immobilizing the layer of metallic nanostructures over the sensing regions. The mostly used metallic nanostructures are nanoparticles of gold (Au) and Silver (Ag). However, with LSPR effect the biocompatibility of optical fiber sensors is also an critical concern, which can be attained by immobilizing a layer of graphene oxide (GO) over the metallic nanostructures. The GO possess a layer of carbon bonds with very high biocompatibility for biomolecules. The development of optical fiber sensors involves various different steps such as fabrication of optical fiber structures, metallic nanostructure synthesis and their immobilization on sensing region, and functionalization of specific enzymes. The functionalization of specific enzyme increases the selectivity of sensors against particular analyte. The performance analysis of optical fiber sensor structures is done by testing their ability in terms of reproducibility, reusability, sensitivity and specificity

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## Biography

Lokendra Singh has completed his PhD at the age of 29 years from DIT University and postdoctoral studies from Liaocheng University, China. Currently, he is the Ph.D. coordinator at University of Engineering and Technology Roorkee, India. His current research interest are optical fiber sensors, biosensors, photonic and plasmonic

devices. He has published more than 40 papers in reputed journals and conferences. He has been invited as speaker in number of international conferences. Recently, he has published a novel work while introducing a plus shaped cavity in optical fiber and used for sensing application.