



## Geometrical impact on sensing based on localized surface plasmon resonance (LSPR) technique

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### Abstract:

A comprehensive analysis has been reported, based on localized surface plasmon resonance phenomenon on responses with the change in probe geometry of optical fiber. Plasmonic responses of noble metal nanoparticles such as AuNPs and AgNPs have been examined for the detection of methanol exclusively by adopting D-type and tapered optical fiber probe. With increase in concentration of methanol, absorbance characteristics of the NPs changes, results in the change in effective refractive index of the medium. Consequently, the change in effective RI leads to alter the output responses of the proposed sensor. A comparative study has been presented with respective change in geometrical shape of the probes to detect methanol. The sensitivity in case of D-type probe for detection of methanol is found to be  $\sim 0.09644$  mV/ppm with AuNPs and  $\sim 0.03038$  mV/ppm with AgNPs. On the other hand, the sensitivity for AgNPs coated probe is found to be  $\sim 0.00389$  mV/ppm and  $0.00379$  mV/ppm for AuNPs in case of tapered probe.

### Biography:

Dimpi Paul received her M.Sc. and Ph.D degree in physics from Tezpur University. My current

research interest is fiber-optic sensors and modelling of PBG structured fiber. Recently she has

completed her Ph.D from Deptt. of physics, Tezpur University. I have published more than 9 papers

in reputed journals along with 2 book chapters and two proceedings and has been serving as guest

lecturer (GL) at NITAP. Presently I am working as guest faculty in GEC Assam India.



### Recent Publications:

- LSPR enhanced gasoline sensing with a U-bent optical fiber, D Paul, S Dutta, R Biswas Journal of Physics D: Applied Physics 49 (30), 305104
- LSPR based Ultra-sensitive low cost U-bent optical fiber for volatile liquid sensing D Paul, S Dutta, D Saha, R Biswas, Sensors and actuators B: Chemical 250, 198-207
- Highly sensitive LSPR based photonic crystal fiber sensor with embodiment of nanospheres in different material domain, RB D, paul, Optics and Laser Technology 101
- Synthesis and characterization of Pd-Fe<sub>2</sub>O<sub>3</sub> nanocomposite and its application as a magnetically recyclable catalyst in ligand-free Suzuki-Miyaura reaction in water D Paul, S Rudra, P Rahman, S Khatua, M Pradhan, PN Chatterjee. Journal of Organometallic Chemistry 871, 96-102
- Investigating photonic crystal fiber within E to L communication band with different material composites, D Paul, R Biswas, NS Bhattacharyya, Optik 126 (23), 4640-4645

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