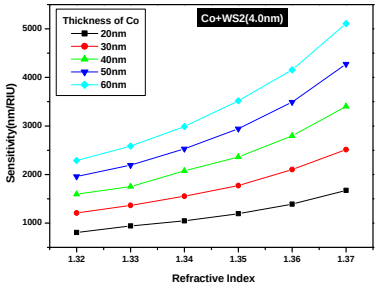
NUMERICAL INVESTIGATION ON THE PERFORMANCE OF SPR BASED FIBER OPTIC SENSORS USING GRAPHENE/TMDC AND METAL LAYERS

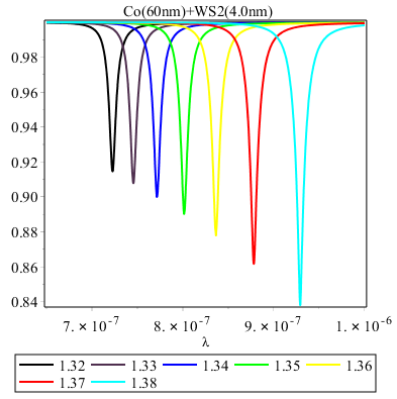
Name of the PI	**Mrs. S. Subanya**	**Sanctioned Year**	**2018-20**
Name of the Co PI's	**-**	**Amount Sanctioned in Rs.**	**1,50,000/-**

Project outcomes:

- ✓ The surface Plasmon resonance based fiber optic sensor for four layer model (core, metal layer - Pt/Au/Ag/Cu/Al/Ni/Co, graphene, sample) was studied theoretically and a detailed numerical analysis on the performance parameter of the optical sensor was done.
- ✓ Combination of Pt/Ni/Co with Graphene shows good sensitivity enhancement and the proposed configuration will surely be a promising candidate for high performance bio-sensing applications. The inclusion of Graphene layer is found to improve the sensitivity of the sensor.
- ✓ The study has further been extended by analysing the performance of a similar sensor with the inclusion of TMDC layers with Co/Ni/Pt metal configuration due to the high performance they exhibited with graphene. The coating of noble metals on TMDCs acts as a protective layer and prevent the metal from getting oxidized and it as well as enhances the sensitivity of the sensor. TMDC based sensor works well as a chemical sensor.
- ✓ The thickness of the metal layer, its dielectric constants and the thickness, length and refractive index of the sensing layer is properly chosen and the sensitivity evaluation is performed and the thickness of the metal layer, the number of graphene and TMDC layers are optimized for both the designed sensor.



Variation of Sensitivity for varying refractive index of sensing medium from 1.32 to 1.38 for Co 60nm thickness along with five layers of WS_2.



Transmittance curve for Co of thickness 60nm with five layers of WS_2 with refractive index of sensing medium varying from 1.32 to 1.38.

❖ Number of Papers presented in Conferences : 7

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