**ABSTRACT**

SPR based fiber optic sensor with Au and Ag nanocomposites with Cu, Al, Ir, Pt and Pd is theoretically studied. The metal nanoparticles exhibit better sensing performance than materials in the macro or large scales and reveal tremendous optical properties because of the collective excitation of conduction electrons. Nanocomposites consisting of Cu, Al, Ir, Pt and Pd nanoparticle with their varying volume fraction embedded in the host dielectric matrices of Au and Ag are considered for the study. By varying the thickness of the nanocomposite layer for various volume fraction, the performance parameters such as FWHM, sensitivity and Q-factor of the proposed sensor were studied and analyzed. The effect of operating wavelength along with the size and volume fraction of nanocomposite is studied on sensor's performance. Further for a fixed nanocomposite thickness and fixed volume fraction of metal nanoparticle, the sensor demonstrates highest sensitivity for Au-Pd nanocomposite than other combinations