

Absorbance properties of gold coated fiber Bragg grating sensor for aqueous ethanol

ABSTRACT

Optical Fiber Bragg Grating (FBG) is commonly deployed as a wavelength selective filter in telecommunication as well as to detect physical changes such as pressure, temperature and strain in sensing applications. This paper presents an investigation of FBG as a chemical sensor towards ethanol in aqueous solution. Telecommunication standard single mode FBGs were coated with different thicknesses of thin gold films via sputtering deposition method. The combination of Bragg gratings and gold film enhances the evanescent wave on the surface of the optical fiber. It was found that the FBG coated with 50 nm gold layer exhibits the strongest response towards water with varying concentrations of ethanol. The sensor shows 55% change in absorbance levels when the concentration of ethanol is increased from 0 to 99.7% in water.

Keyword: Optical fiber; Bragg grating; Sensor; Absorbance; Ethanol; Gold