

Single mode tapered fiber-optic interferometer based refractive index sensor and its application to protein sensing

ABSTRACT

We demonstrate refractive index sensors based on single mode tapered fiber and its application as a biosensor. We utilize this tapered fiber optic biosensor, operating at 1550 nm, for the detection of protein (gelatin) concentration in water. The sensor is based on the spectroscopy of mode coupling based on core modes-fiber cladding modes excited by the fundamental core mode of an optical fiber when it transitions into tapered regions from untapered regions. The changes are determined from the wavelength shift of the transmission spectrum. The proposed fiber sensor has sensitivity of refractive index around 1500 nm/RIU and for protein concentration detection, its highest sensitivity is 2.42141 nm/%W/V.

Keyword: Fiber-optic interferometers; Protein sensing; Refractive index sensor; Single mode tapered fiber