

Sensitive and specific protein sensing using single-mode tapered fiber immobilized with biorecognition molecules

ABSTRACT

We examine and demonstrate a biosensor using single-mode tapered fiber that has been immobilized with biorecognition molecules to sense targeted proteins. Interaction of evanescent waves with the external medium surrounding the tapered region produces an interferometric-patterned spectrum, which shifts correspondingly to any changes of refractive index (RI) in the external medium. The proposed setup managed to obtain an RI sensitivity and concentration sensitivity of 2526.8 nm/RIU and 20.368 nm/ μ M, respectively, which, to our knowledge, is highly sensitive when compared with previous studies. The dynamic performance, good specificity, and high sensitivity of the proposed method highlight an immensely beneficial choice for immunological diagnostics.

Keyword: Tapered microfiber; Refractive-index sensor; Biosensors; Biophotonics instrumentation