

Dengue E protein detection using a graphene oxide integrated tapered optical fiber sensor

ABSTRACT

We report the use of a biofunctionalized tapered optical fiber based sensor with the integration of graphene oxide (GO) for the detection of Dengue virus (DENV) II E proteins. The tapered region was deposited with GO and functionalized with anti-DENV II E protein IgG antibodies to be tested with different concentrations of DENV II E proteins. The sensor obtained a detection limit of 1 pM with a sensitivity value of 12.77 nm/nM, which was better compared to previously reported studies. The sensor also showed high precision, great selectivity, and high affinity toward E protein with a dissociation constant of $K_d = 1.11 \times 10^{-9} \text{ M}^{-1}$. The proposed sensor has undoubtedly exhibited the immense potential of nanomaterial integration for future advancements of dengue diagnostics.

Keyword: Optical fiber sensors; Biophotonics