

Sensitive surface plasmon resonance performance of cadmium sulfide quantum dots-amine functionalized graphene oxide based thin film towards dengue virus E-protein

ABSTRACT

An optical sensor for the dengue virus (DENV) E-protein based on cadmium sulfide quantum dots composited with amine functionalized graphene oxide (CdS-NH₂GO) thin film was successfully developed. A specific monoclonal antibodies (IgM) were covalently attached to CdS-NH₂GO via EDC/NHS coupling to sense targeted E-proteins. The SPR sensor exhibited an excellent detection limit (0.001 nM/1 pM) with sensitivity of 5.49° nM⁻¹ for the detection of DENV E-protein. The binding affinity, as well as the performance of the Au/CdS-NH₂GO/EDC-NHS/IgM film, was successfully obtained at 486.54 nM⁻¹ in detecting DENV E-proteins. These results indicated that the Au/CdS-NH₂GO/EDC-NHS/IgM film shows high potential sensitive and stronger binding towards DENV E-protein.

Keyword: Surface plasmon resonance; Binding affinity; DENV E-protein