

## Optical and structural properties of cadmium sulphide quantum dots based thin films as potential sensing material for dengue virus E-protein

### ABSTRACT

In this work, cadmium sulfide quantum dots composited with polyamidoamine dendrimer (CdSQDs-PAMAM) thin film had been successfully developed for use in the detection of dengue virus (DENV) E-proteins. Studies involving XRD, EDX, UV-Vis-NIR, and AFM analyses proved the presence of CdSQDs and PAMAM nanoparticles. The mechanism of sensor surface functionalization was confirmed using FTIR spectra. The SPR responses showed a significant shift in resonance angle after exposure to different concentrations of DENV E-protein solution. From this observation, the Au/CdSQDs-PAMAM/IgM sensor film obtained a quantification limit of 0.0001 nM with the association constant of  $2.53 \times 10^3 \text{ M}^{-1}$ , which was better compared to the Au/IgM and Au/PAMAM/IgM sensor films. The matrix analysis was successfully performed using spiked bovine serum albumin obtaining excellent recovery values in the results. The enhancement of the SPR responses thus showing the high potential of CdSQDs-PAMAM thin film as dengue sensing material in SPR techniques for the future development of dengue diagnostic.

**Keyword:** Cadmium sulfide; Thin film; Quantum dots; PAMAM dendrimer; Surface plasmon resonance