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Original Article

Fabrication and characterizations of Al nanoparticles doped ZnO nanostructures-based integrated electrochemical biosensor



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ABSTRACT

The benefits of the electrical-based biosensor include cheap production and fast response time of detecting diseases. An interdigitated electrode (IDE) is fabricated using silver (Ag) as a metal contact that is deposited on aluminium (Al) nanoparticles doped with both zinc oxide (ZnO) and Silicon (Si) forming AZO/Si nanostructures by vacuum coater in a thermal evaporator. The electrical properties are studied as a function of frequency and voltage using I-V characteristics. Sol-gel method under annealing temperature, 500 °C is utilized to generate Al nanoparticles doped ZnO nanostructures. UV-vis spectrophotometer, Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM) and X-ray diffractometer (XRD) are used for analyzing optical, topographical, morphological and structural studies of AZO nanostructure, respectively. Specific empirical models of optical dielectric constant, bulk modulus and refractive index are also verified.

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