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Titanium dioxide (TiO_2) nanoparticles on aluminium interdigitated electrodes (Al IDE) for sensitive pH detection

Abstract

Titanium dioxide (TiO2) nanoparticles based Aluminium Interdigitated Electrode (Al IDE) was tested as pH electrodes and measured quantitatively. TiO2 nanoparticle was synthesized using sol-gel method with monoethanolamine (MEA) as a catalyst. The mixing of titanium butoxide as a precursor, ethanol as a solvent and MEA as stabilizer were stirred using magnetic stirrer under ambient temperature. Al IDE were fabricated by conventional photolithography method. TiO2 solution prepared then was deposited on Al IDE using spin-coater and the coated device were annealed at 400°C. Deposition of TiO2 solution on the fabricated Al IDE forms a sensor that promising for development of TiO2 nanoparticle based biosensors. The surface morphologies structural properties were studied using Scanning Electron Microscopy (SEM). The small amount of current measurement of this device towards hydrogen and hydroxide ions was measured by Keithley 2450 pico ammeter.

Keywords

Measuring instruments; Photolithography; Scanning electron microscopy; Sol-gel process; Nanoparticle; Chemical elements; Transition metal oxides; Interdigitated electrode; Catalysts and Catalysis; Biosensors