Effect of Using a Mixture of Al2O3 Nanoparticles and 3-Aminopropyltriethoxysilane as the Sensing Membrane for Polysilicon Wire on pH Sensing

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Abstract : In this work, a polysilicon wire (PSW) coated with a mixture of 3-aminopropyltriethoxysilane (r-APTES) and Al2O3 nanoparticles as the sensing membrane prepared with various Al2O3/r-APTES and dispersing agent/r-APTES ratios for pH sensing is studied. The r-APTES and dispersed Al2O3 nanoparticles mixture was directly transferred to PSW surface by solution phase deposition (SPD). It is found that using a mixture of Al2O3 nanoparticles and r-APTES as the sensing membrane help in improving the pH sensing of the PSW sensor and a 5 min SPD deposition time is the best. Dispersing agent is found to be necessary for better pH sensing when preparing the mixture of Al2O3 nanoparticles and r-APTES. The optimum condition for preparing the mixture is found to be Al2O3/r-APTES ratio of 2% and dispersing agent/r-APTES ratio of 0.3%.

Keywords: al2o3 nanoparticles, ph sensing, polysilicon wire sensor, r-aptes

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