Short Communication

Preparation of Phosphate Ion-Selective Membrane Based on Silver Salts Mixed with PTFE or Carbon Nanotubes

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doi: 10.20964/2018.02.49

Received: 14 November 2017 / Accepted: 13 December 2017 / Published: 28 December 2017

A sensitive phosphate sensor has been prepared by constructing a solid membrane disk consisting of variable mixtures of silver phosphate, silver sulfide, and PTFE (Type 1 membrane) or silver phosphate, silver sulfide and nanotube (Type 2 membrane). The ternary membranes exhibit greater selectivity over the wide range of concentration. The membrane with the composition of 50.00% PTFE; 41.66% Ag₃PO₄ and 8.33% Ag₂S was selected as our preferred membrane. The membranes exhibited linear potential response in the concentration range of 1×10^{-1} to 1×10^{-5} M. Their detection limit is about 5×10^{-6} M. The membranes have a long lifetime and can be stored in air when they are not in use. The best performance for nanocomposite sensor was obtained with membrane of the following composition: 78.00% Ag₃PO₄; 20.00% Ag₂S, and 2.00% carbon nanoparticles. The membrane had a slope of 32.6 mV toward HPO₄²⁻ ions in the range between 1×10^{-1} and 1×10^{-5} M with a detection limit of 5.45×10^{-6} M. The proposed sensors were found to be applicable over a pH range between 3 and 7.

Keywords: ion selective electrode, monohydrogen phosphate, potentiometry, carbon nanotubes, PTFE.

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