Development of a New Potentiometric Sensor based on home made Iodide ISE Enriched with ZnO Nanoparticles and its Application for Determination of Penicillamine

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This paper describes the preparation and application of “home-made” iodide ISE enriched with ZnO nanoparticles. Iodide ISE membrane was made of AgI:Ag₂S:PTFE = 1:1:2 and enriched with ZnO nanoparticles in ratio 1-5.0 wt.%. Prepared membranes were used for penicillamine (Pen) determination in acetic buffer (pH = 4-4.75) and in perchloric acid (pH = 1-2). Due to the low price method, simplicity and relative speed, a possibility for Pen determination was found. Pen determination showed better results in an acetic buffer, pH = 4 than in perchloric acid. All experiments for Pen measurements were done without pretreatment of pharmaceuticals. The determination is based on the reaction between Pen with both Ag⁺ and Zn²⁺ from the electrode membrane. A newly described method has linear response range for Pen 2.45×10^{-6} - 1×10^{-2} mol L⁻¹ and a detection limit of 2.24×10^{-6} mol L⁻¹. The found concentrations of Pen are in a very good agreement with the declared ones with the standard deviation of 2.70 %.

Keywords: penicillamine, potentiometric, determination, “home-made” ion-selective electrode, nanoparticles

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