

Thesis Title

Fabrication and Characterization of Lead Ion Selective Electrode

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Member**Abstract**

Lead ion selective electrode (Pb-ISE) ; a solid state type , was fabricated by using a mixture of Ag_2S and PbS as the membrane. Method for fabrication of the electrode was studied and found that the optimum mole ratio of Ag_2S to PbS for making a membrane was 1:1. The mixture was pressed to obtain the membrane thickness of 1.00 mm, then the membrane was assembled to be an electrode using Ag/AgCl ; an internal reference electrode, dipped into the 1×10^{-2} M solution of $\text{Pb}(\text{NO}_3)_2$ of which the ionic strength was adjusted to be 0.1 M with 0.2 M KNO_3 . The characteristics of the prepared electrode was found that good working conditions was in the pH range of 2 to 6. The optimum storage conditions was the immersion of the electrode tip in distilled water or to cover the membrane with parafilm, this resulted in the operative lifetime of the electrode to be 15 days. The sequence of interfering ions to this electrode could be ordered as $\text{Hg}^{2+} > \text{Ag}^+ > \text{Cu}^{2+} \sim \text{Fe}^{3+} > \text{Cd}^{2+} > \text{Fe}^{2+} > \text{Zn}^{2+}$. Linear response of the prepared Pb-ISE was in the range of 1.0×10^{-2} to 1.0×10^{-4} M with the slope of 20.5 to 23.0 mV and the detection limits for the electrode was in the range of 3.2×10^{-5} to 4.9×10^{-5} M.