Detection of Bromide Ions in Water Samples with a Nanomolar Detection Limit using a Potentiometric Ion-selective Electrode

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This paper presents a robust potentiometric solid-contact ion-selective electrode (ISE) for the rapid detection of bromide ions (Br^-) in water samples. The sensing membrane contains poly (vinyl chloride) (PVC), bis(2-ethylhexyl)sebacate (DOS) and ionophore without a lipophilic ion exchanger, and provides good potential responses for Br^- in the range of 0.010 to 1.0 μM . The calibration curve demonstrates detection limits of 2.0×10^{-9} mol/L (3σ) for bromide ions. Moreover, compared with previously reported Br^- -selective ISEs, the proposed ISE offers remarkably improved sensitivity for the detection of bromide and provides better selectivity coefficients for HPO_4^{2-} , CH_3COO^- , NO_3^- , and Cl^- . The proposed sensor is successfully applied for the practical determination of Br^- in real water samples.

Keywords: ISEs; Bromide ions; potentiometric; solid contact

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