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

Lijuan Kou\textsuperscript{1,*} and Rongning Liang\textsuperscript{2}

\textsuperscript{1} School of Enology, Binzhou Medical University, Yantai, 264003, P. R. China.
\textsuperscript{2} Key Laboratory of Coastal Environmental Processes and Ecological Remediation, Yantai Institute of Coastal Zone Research (YIC), Chinese Academy of Sciences (CAS), Shandong Provincial Key Laboratory of Coastal Zone Environmental Processes, Yantai YICCAS, Yantai, 264003, P. R. China.

\textsuperscript{*}E-mail: ljkou@yic.ac.cn

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This paper presents a robust potentiometric solid-contact ion-selective electrode (ISE) for the rapid detection of bromide ions (Br\textsuperscript{−}) 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\textsuperscript{−} in the range of 0.010 to 1.0 μM. The calibration curve demonstrates detection limits of 2.0×10\textsuperscript{-9} mol/L (3σ) for bromide ions. Moreover, compared with previously reported Br\textsuperscript{−}-selective ISEs, the proposed ISE offers remarkably improved sensitivity for the detection of bromide and provides better selectivity coefficients for HPO\textsubscript{4}\textsuperscript{2−}, CH\textsubscript{3}COO\textsuperscript{−}, NO\textsubscript{3}−, and Cl\textsuperscript{−}. The proposed sensor is successfully applied for the practical determination of Br\textsuperscript{−} in real water samples.

Keywords: ISEs; Bromide ions; potentiometric; solid contact

FULL TEXT

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