Batch and Flow-Injection Analysis of Lauryl Sulfate in Industrial Products and Wastes Using Membrane Sensors Based on Methyltrioctylammonium Chloride

Hisham S. M. Abd-Rabboh^{1,2,*}

¹ Chemistry Department, Faculty of Science, King Khalid University, PO Box 9004, Abha 61413, Saudi Arabia

² Department of Chemistry, Faculty of Science, Ain Shams University, Abbassia, Cairo 11566, Egypt

*E-mail: hasalah@hotmail.com

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Liquid polymeric membrane sensors based on the hydrophobic cationic surfactant methyltrioctylammonium chloride (MTOAC) are described herein for batch and flow injection analysis of sodium lauryl sulfate (SLS) surfactant. PVC-based membrane sensors were prepared using different plasticizers in two different electrode designs: conventional polymeric membrane discs for batch measurements and flow-through half cell module for flow-injection analysis. o-nitrophenyloctyl ether plasticized sensors exhibited the most distinguished response characteristics among other sensors in 10^{-2} M phosphate buffer solution at pH =7, with a lower detection limit of 3.97×10^{-7} M, a linear dynamic range of $9.33 \times 10^{-7} - 5.31 \times 10^{-3}$ M, a slope of -59.4 mV/concentration decade, a correlation coefficient of 0.999 and a response time of 60 s. The sensors were selective towards SLS over other common anions and exhibited a long life time (more than 2.5 months) with a constant detection limit, an enhanced linear range, and a slight increase in its slope. The fabricated sensors were efficiently used in the determination of SLS concentrations in a wide range of samples including powder detergents, tooth paste, liquid hand wash, and shampoo, and wastewater.

Keywords: Potentiometry; flow-injection analysis; ion-selective electrode; sodium lauryl sulfate; surfactant analysis

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