Eu³⁺ PVC Membrane Sensor Based on 1,2-Diaminopropane-N,N,N',N'-Tetraacetic Acid

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Abstract : A highly selective poly(vinyl chloride)-based membrane sensor produced by using 1,2-Diaminopropane-N,N,N',N'-tetraacetic acid (DAPTA) as active material is described. The electrode displays Nernstian behavior over the concentration range 1.0×10^{-6} to 1.0×10^{-2} M. The detection limit of the electrode is 7.2×10^{-7} M. The best performance was obtained with the membrane containing 30% polyvinyl chloride (PVC), 65% nitrobenzene (NB), 2% sodium tetra phenyl borate (Na TPB), 3% DAPTA. The potentiometric response of the proposed electrode is pH independent in the range of 2.5–9.1. The proposed sensor displays a fast response time 'less than 10s'. The electrode shows a good selectivity for Eu (III) ion with respect to most common cations including alkali, alkaline earth, transition, and heavy metal ions. It was used as an indicator electrode in potentiometric titration of 25 mL of a 1.0×10^{-4} M Eu (III) solution with a 1.0×10^{-2} M EDTA solution.

Keywords : potentiometry, PVC membrane, sensor, ion-selective electrode
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