Construction of a New Selective and Sensitive Nd^{3+} ion-selective Electrode Based on 1-nitroso-2-naphtol as a Neutral Ion Carrier

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In this work, we found that 1-nitroso-2-naphtol (NN) can be used as a sensing material for the fabrication of a new highly selective neodymium(III) ion-selective membrane sensor. The best characteristics was obtained for the proposed Nd^{3+} sensor having a composition of PVC: nitrobenzene (NB): sodium tetraphenyl borate (NaTPB): NN in the ratio of 30:67:2:1 (wt%). The sensor displays a Nernstian slope of 19.7 ± 0.4 mV decade⁻¹ for Nd^{3+} ion with detection limit of 6.5×10^{-7} mol L⁻¹ between pH 2.5 and 9.6. The working concentration range of the constructed sensor was 1.0×10^{-6} to 1.0×10^{-2} mol L⁻¹ with a short response time (~8 s). The selectivity coefficients obtained using matched potential method (MPM) indicate good selectivity for neodymium ion with respect to other cations. The created sensor was successfully utilized as an indicator electrode for the potentiometric titration of neodymium ions with EDTA and the determination of neodymium contents in presence of various ions mixture.

Keywords: Potentiometry, PVC Membrane, Sensor, Ion-Selective Electrode

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