Construction of a new Lu^{3+} poly(vinyl chloride) membrane sensor Based on 2,2'-[propane-1,3-diylbis(thio)]dianiline as a suitable sensing material

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This paper introduces the development of an original Lu^{3+} -PVC membrane electrode based on 2,2'-[propane-1,3-diylbis(thio)]dianiline (PDTD) as a sensing carrier. The electrode presents a Nernstian slope of 19.8 ± 0.4 mV decade⁻¹ for the in the Lu^{3+} ions across a broad working concentration range from 1.0×10^{-6} to 1.0×10^{-2} mol L⁻¹ with a lower detection limit of 8.2×10^{-7} mol L⁻¹ in the pH range of 2.5 – 8.4. The electrode response time was rapid (~9 s), and its selectivity with respect to mono and divalent metal ions (Na^+ , K^+ , Ca^{2+} , Mg^{2+} , Co^{2+} , Cd^{2+} , and Pb^{2+}) and trivalent ions (Fe^{3+} , Al^{3+} and Cr^{3+}), including members of the lanthanide family (Er^{3+} , Dy^{3+} , La^{3+} , Tm^{3+} , Nd^{3+} , Ho^{3+} , Gd^{3+} , Sm^{3+} , Yb^{3+} , Pr^{3+} , Eu^{3+} and Tb^{3+}) other than Lu^{3+} was good. The making sensor has been put to use successfully as an indicator electrode in analytical applications such as the potentiometric titration and determination of Lu^{3+} ion in blend of different ions.

Keywords: PVC membrane, Potentiometry, Sensor, Ion-selective electrode

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