A Novel Iron(III) Potentiometric Sensor Based on (E)-N'-((2-hydroxynaphthalen-3-yl)methylene)benzohydrazide

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doi: 10.20964/2016.08.02

Received: 9 April 2016 / Accepted: 21 May 2016 / Published: 7 July 2016

Here, we report the design and application of a new PVC membrane electrode, based on (E)-N'-((2-hydroxynaphthalen-3-yl)methylene)benzohydrazide as a reliable complexing agent, for determination of iron(III) ion. The electrode illustrates an excellent Nernstian slope of 19.9 ± 0.3 mV/decade over a wide linear range of concentration from 5.0×10^{-9} to 1.0×10^{-2} M with a detection limit of 1.0×10^{-9} M of Fe^{3+} in solution. The tolerable pH range of 2.4 to 4.0, response time of 10 s and measurement stability for 3 months is valuable characteristics of the sensor. The analytical application of the sensor was successfully tested by potentiometric titration of a Fe(III) solution with EDTA in some water samples. The accuracy of given measuring data was tested by determination of Fe^{3+} in some water solutions from different resources with both the sensor and an atomic absorption spectrometer, as a standard method. The results were well comparable. We inform a reliable device that provides a simple method to determine Fe^{3+} ion in a fast manner with high accuracy.

Keywords: Benzohydrazide; Iron(III); Potentiometric sensor; PVC membrane

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