

## عنوان مقاله:

Fabrication of a new nanosensor based on PVC membrane for determination of ammonium ions

## محل انتشار:

یازدهمین سمینار سالانه الکتروشیمی ایران (سال: 1394)

تعداد صفحات اصل مقاله: 2

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## خلاصه مقاله:

Ion-selective electrodes (ISE) are useful devices for determining the different cationic and anionic species because of high speed, low cost, simple preparation, a wide dynamic range and finally no requirement for the sample pretreatment [1]. In addition of using ISEs for direct determination of the investigated species they can be also used for indirect determination of other species [2]. Excess ammonia in the breeding pool may cause massive death of fish and other aquatic organisms due to eutrophication and depletion of the dissolved oxygen [3]. Furthermore, bacteria can convert ammonia into nitrite, which is a potent carcinogen [4]. Therefore, measuring ammonia content in water is important for aquaculture, drinking water and environmental monitoring. Traditional methods for measuring ammonia content were based on Nessler's reagent colorimetry, indophenol, Ophthaldialdehyde (OPA) and N-acetyl-cysteine (NAC) reagent, and titration. These methods are commonly cost and need the primary preparation steps. In this research, a new nanosensor were prepared by incorporating sytosine amino acid as a ionophore with together a modified magnetic nano particles into a plasticized poly(vinyl chloride) matrix. The general procedure used to prepare the PVC membrane was mixing thoroughly optimised amounts of 30 mg of powdered PVC, 60 mg plasticizer DBP, 5 mg additive KTpCIPB, 5 mg magnetic nano particles Fe<sub>3</sub>O<sub>4</sub> modified and 2 ml of dry freshly distilled THF into a glass dish of 2 cm diameter. To this solution for the fabrication of the ammonium-selective membran 5 mg of sytosine as an ionophore was added and mixed very well. The solvent was evaporated at the room temperature. After 2 h the polymer membranecould be easily removed from the plate. Then the transparent PVC membrane was taken up from the plate and attached to the end of a glass tube with a diameter of 1 cm and height of 5 cm by means of PVC-THF viscose solution. The NH<sub>4</sub><sup>+</sup>-selective electrodes were each time backfilled with NH<sub>4</sub>Cl internal filling solution of 0.01 mol dm<sup>-3</sup> conditioned. Then the electrodes were conditioned in 0.01 mol dm<sup>-3</sup> solution of MgCl for 48 h. Calibration plots with Nernstian slopes (59.6 ± 0.8 mV/decade) for ammonium ion were observed over a linear range of concentration (1.0 × 10<sup>-6</sup> to 1.0 × 10<sup>-1</sup> mol dm<sup>-3</sup>, at 25 oC). This electrode revealed a lower limit of detection of 3.9 × 10<sup>-7</sup>. It has a short response time about 15 second. The influence of membrane composition, the pH of the test ... solution, the interfering ions on the electrode performance and the effect of temperature on the electrode response

## کلمات کلیدی:

Ammonium selective, PVC membrane, Nano particles, Potentiometric method

