**A potentiometric membrane sensor based on kryptofix 21 for determination of uranyl ions in environmental samples and optimization by mixture design method**

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**Abstract**

Uranyl ion exists at trace levels in the environment and can cause severe adverse effects to human health. Therefore, it is desirable to develop analytical methods that can determine the trace uranyl ion in aqueous medium [1].There is special interest for U(VI) analysis in nuclear industry, in particular, for use in fuel separation and processing. Several steps are necessary in this process including leaching from ores, purification by ion exchange or solvent extraction, precipitation, reduction, etc [2]. The uranium monitoring in all these process streams as well as in radioactive wastes is of increasing interest [3]. PVC-membrane sensor as a simple method, offers several advantages such as speed and ease of preparation, simple instrumentation, fast response, wide dynamic range, reasonable selectivity and low cost. This has using various neutral carriers [4].

In this study, 1,4,10-tetraoxa 7,13-diazacyclopentadecane (kryptofix 21) is used as a ionophore in plasticized poly(vinyl chloride) (PVC) matrix membrane sensor for uranyl ions. The sensor displays a rapid and linear response for uranyl ions over the concentration range 1.0 × 10-1 to 1.0 × 10-4 mol l-1 uranyl ion with a Nernstian slope of 29.2mVper decade. slope optimized by mixture design method. The effect of the various parameters, e.g. effect of pH, effect of time and etc, have been established and optimized. The sensor is used for the determination of uranium as uranyl ions in real sample. The results are compared with those obtained by independent UV–vis technique.

***Keywords****:* Potentiometry; Uranyl ions; Environment

***References:***

*1 X. Shua , Y.Wang , Sh. Zhang , Li Huang , Sh.Wang ,D. Huaa, Talanta 2015 , 131, 198*

*2 M. B. Saleh , E. M. Soliman, A. A. Abdel Gaber, S. A. Ahmed, Sensors and Actuators B,*

 *2006,114, 199*

*3 M. B. Saleh, A. A. Abdel Gaber, Nahed A. Abdel Kream, Sensors and Actuators B 2003, 94,*

 *140*

*4 A.Ghaemi ⁎ , H. Tavakkoli, T. Mombeni, Materials Science and Engineering c, 2014,38,186*

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