



## A potentiometric membrane sensor based on kryptofix 22 for determination of uranyl ions in environmental samples

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Uranium dioxide is used in the preparation of fuel pellets used in nuclear power reactors. Several steps are necessary in this process including leaching from ores, purification by ion-exchange or solvent extraction, precipitation, reduction, etc. The monitoring of uranium concentration in all these process streams is essential to evaluate the efficiency of the extraction or stripping step. Several analytical methods, such as spectrophotometry and fluorometry were used for uranium quantification[1-2].

Potentiometric sensors based on ion-selective electrodes are especially suited for such determination because they offer advantages such as selectivity, sensitivity, good precision, simplicity and low cost. One of the most common classes of sensors is that based on ionophores – organic and inorganic compounds that bind to ions[3].

In this study, the electrode was prepared by coating the surface of a graphite rod by a membrane containing 1,7,10,16 tetra oxa 4,13 diaza cyclo octa decane (kryptofix 22) as an ionophore, acetophenone (AP) as plasticizer, graphite as an additive and poly(vinyl chloride) (PVC). The sensor displays a rapid and linear response for uranyl ions over the concentration range  $1.0 \times 10^{-1}$  to  $1.0 \times 10^{-4}$  mol l<sup>-1</sup> uranyl ion with a Nernstian slope of 30.1 mV per decade. 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.

### References

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