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Determination of Thorium (IV) by Simple Spectrophotometric Technique

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ABSTRACT

A simple and sensitive spectrophotometric method has been developed for the determination of Thorium (IV) using Bromophenol Blue dye as a reagent. Thorium (IV) forms an Orange Yellow coloured water soluble complex with the reagent in acidic medium at pH 3.0. The molar absorptivity and Sandell's sensitivity of coloured species are $1.6 \times 10^5 \text{ dm}^3 \cdot \text{mol}^{-1} \text{ cm}^{-1}$ and $0.00625 \mu\text{g cm}^3^{-1}$ respectively. Beer's law is obeyed in the range $0.232\text{-}2.32 \mu\text{g mL}^{-1}$ of thorium (IV) at λ_{max} 455 nm. Thorium (IV) forms 1:4 complexes and the effect of interferences was studied. The merits and demerits of several other spectrophotometric methods for Thorium (IV) are also discussed.

Keywords: Spectrophotometric technique, Thorium (IV), Bromophenol blue.
