

EXTRACTIVE SPECTROPHOTOMETRIC DETERMINATION OF ZIRCONIUM(IV)

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Zirconium(IV) forms a colourless complex with N-phenyl-benzohydroxamic acid (NPBHA) which is extractable into chloroform from 3.5 M hydrochloric acid. This chloroform extract, on second extraction from 0.5M hydrochloric acid medium in the presence of phenylfluorone (PF) in acetone forms an intensely coloured complex possessing an absorption maximum at 534 nm against a reagent blank. This system obeys Beer's law up to 7 ppm of zirconium(IV). The molar absorptivity is $1.125 \times 10^4 \text{ dm}^3 \text{ mol}^{-1} \text{ cm}^{-1}$. We were successful in achieving solubility of zirconium(IV)-NPBHA-PF complex in chloroform by using acetone instead of isoamyl alcohol¹ and ethanol² which have been used for the extractive spectrophotometric determination of titanium(IV) and molybdenum(VI) respectively.

Considerable amounts of many cations and anions including 10-fold molar excess of vanadium(IV), iron(III) and molybdenum(VI) can be tolerated. Equimolar quantities of aluminium(III), fluoride, phosphate and vanadium(V) are tolerable. Slight interference from titanium(IV) and niobium(V) has been observed when the molar ratio of zirconium: ion exceeds 1:0.3. The method has been successfully applied to the determination of zircon sand.

References

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