E2-34 Extractive spectrophotometric determination of zirconium (IV) by ternary complex formation

G Aashana Jurangpathy, H Dasaratha Gunawardhana
Centre for Analytical Research and Development, Dept of Chemistry, University of Colombo, Colombo 3

N-Phenylbenzohydroxamic acid reacts with zirconium (IV) to give a colourless complex which can be extracted into dichloromethane. A synergic effect was observed when the extraction was carried out in the presence of 8-hydroxyquinoline in 1.5M hydrochloric acid solution. The dichloromethane extract of the zirconium (IV) complex, in the synergic extraction system, on a second extraction from a dilute hydrochloric acid medium (0.8M) in the presence of phenylfluorone in acetone and dichloromethane mixture, formed an intensely coloured complex with an absorption maximum at 532.8nm.

The conditions for the formation of coloured complex were optimised. The molar absorptivity under optimum conditions was 1.725×10^4 dm^3 mol^{-1} cm^{-1}. The system obeyed Beer's law upto 3.5 mg dm^{-3} of zirconium (IV) in the extract. Interference from foreign ions was studied, and, cations such as molybdenum (VI), titanium (IV) and anions such as fluoride and phosphate were found to interfere with the colour development. The method was successfully applied for the determination of zirconium (IV) in zircon sand.