

A β-DICHA-TYPE LIGAND FOR THE SELECTIVE EXTRACTION OF TITANIUM

A DISSERTATION

Submitted in partial fulfilment of the requirements for the Degree
of Master of Science of the University of Colombo-Sri Lanka.

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August-1980.

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ABSTRACT

This study is one of a series of research studies on the feasibility of extracting valuable metals from indigenous mineral deposits with reagents which can be produced locally. As such it moves towards the verification of the efficiency of the synthesised reagent in metal extraction and is not a complete analysis of all aspects of the chemistry involved in the extraction.

The reagent, a disubstituted hydroxylamine, derives its substituents from coconut oil and phenylhydroxylamine - and dissolves freely in inexpensive petroleum spirits.

The liquid-Liquid extraction techniques involving lower costs, less environmental pollution and efficient use of low grade ores is employed to extract titanium from ilmenite uncontaminated by the other constituent elements. The extraction efficiency was determined purely by aqueous layer analyses of the unextracted portion.

The results show that the reagent is capable of extracting pure titanium upto fifty six percent both from synthetic and authentic samples of ilmenite in solution, solely by adjusting the mineral acid concentration of the leach solution, to 5 to 7 molar with respect to hydrochloric acid which is the preferred acid. Sulphuric, nitric and perchloric acids show lower efficiencies but no coextractions of iron with

titanium. The major impurity hitherto, iron (III) does not coextract below pH 0.0 irrespective of its concentration or the mineral acid used. The reagent selectively extracts titanium leaving iron (II), iron (III) and aluminium in the aqueous solution. Nearly all the extracted titanium can be stripped into an aqueous layer of pH above 8.0.

These findings suggest that the disubstituted hydroxylamine reagent synthesized using coconut oil is a valuable extractant of titanium from ilmenite deposits and other titaniferous ores.