SOLVENT EXTRACTION STUDIES OF Fe(III), Ti(IV) AND W(VI) USING CASTOR OIL BASED N-PHENYLHYDROXAMIC ACID

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by

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ABSTRACT

The scope of solvent extraction studies that has been conducted with N-Benzoylphenylhydroxylamine and its analogues is so large and numerous, that it is possible to consider it as a separate branch of analytical chemistry. In this project, the reagent is the N-Phenylhydroxamic acid derivative from castor oil for which the petroleum ether has been selected as the solvent since it is readily available and inexpensive. The ligand was characterised by Thin Layer Chromatography in several developing solvents.

Nature presents metals as mixtures in ores and separation of a particular metal can be achieved by selective extraction employing a suitable ligand. Hence solvent extraction studies of iron III, titanium IV and tungsten VI were carried out with the above reagent using independent metal ion solutions, with the hope of applying to a mixture if suceeds.

Analysis of the organic phase for the amount extracted was not carried out due to the great difficulty in destroying the organic matter, but aqueous layer was analysed instead, to determine the unextracted portion.

Characteristic solvent extraction curves were obtained for iron III, titanium IV and tungsten VI. The influence of parameters such as shaking time and ionic strength on extraction were studied and their optimum values were determined.

For the very first time, for a hydroxamic acid type ligand of a natural origin, an extraction of iron III in high acidic medium was observed. Zero extraction of titanium IV was found in strongly acidic media with the three acids hydrochloric, sulphuric and nitric where as tungsten showed a constant percentage extraction both in high acidic medium of 1-8.6 N in hydrochloric acid and in the pH region of 0-10.1.

The reagent was found to be susceptible to oxidation.