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SOLVENT EXTRACTION OF
COBALT AND NICKEL CARBOXYLATES

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ABSTRACT

This thesis is concerned with the solvent extraction of ternary complexes of cobalt(II) and nickel(II). In a preliminary survey, the extraction of nickel(II) by a variety of systems containing carboxylic acids in the presence of 1,2-diaminoethanes was investigated in order to determine the extent to which these complexes extract into different solvents. The aromatic carboxylic acids studied were benzoic, p-toluic, phenylacetic, cinnamic, anthranilic and salicylic acid while the aliphatic acids studied were butanoic, hexanoic, octanoic, decanoic, dodecanoic, 2-bromohexanoic, 2-bromooctanoic, chloroacetic and 2-chloropropanoic acid. The 1,2-diaminoethane used in conjunction with these acids were ethylenediamine, 1,2-diaminopropane, 1,2-diamino-2-methylpropane, 1,2-diaminocyclohexane, N,N'-diaminoethylenediamine, N,N-diaminoethylenediamine and N,N,N',N'-tetramethylethylenediamine. Of the aromatic ternary systems studied, salicylic acid with either 1,2-diaminocyclohexane or a N-substituted diamine were found to give the highest extraction. These were then investigated in depth to determine the number and nature of the extracted species.

Unlike the aromatic acids, the longer chain n-carboxylic acids are capable of quantitative extraction in the absence of a diamine. During the course of this part of the project it therefore became necessary to investigate the extraction of nickel(II) both by the acids alone and by the acids in combination with a diamine. It was found that the inclusion of a diamine had little influence on the pH of extraction.

Finally, the extraction of cobalt(II) by combination of salicylic acid and N,N'-dimethylethylenediamine and N,N,N',N'-tetramethylethylenediamine and by decanoic acid alone were investigated. The behaviour of cobalt(II) and nickel(II) in equivalent systems were compared in order to assess the degree of separation obtainable.

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