Diluent Effect on Co/Ni Separation by Flat Sheet Supported Liquid Membrane Using Alamine 300 as Carrier

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The potential sources of heavy metals pollution are various effluents releasing out of industries, domestic activities and erosion of natural deposits. However, if these metals are continuously released into the biosphere, they may inevitably affect the terrestrial and aquatic organisms. Cobalt and nickel are essential trace elements, having an important role in many body functions. These elements are required in small amounts; while they are toxic in large amounts. Chronic ingestion of Co in daily diet can cause some toxicological effects [1,2, 3].

In this present work, the extraction and separation of the Co (II) was conducted from the Acidic solutions containing Co (II) and Ni (II) using Alamine 300. During the extraction of cobalt, seven different organic solvents were used. In conventional solvent extraction and in LM processing, the diluent of membrane should affect the metal transport and the membrane performance. It has been suggested that the polarity and viscosity of the diluent is the most decisive factor to determine effectiveness as a membrane medium, but on the other hand, rapid transport is the major choice to be made in choosing a membrane diluent. Best Co (II) permeation was obtained using chloroform as a diluent for Alamine 300, whereas with Toluen, Xylene, Kerosene, Escaid100, Escaid110 and Escaid 200 were obtained slightly lower extraction values when compared with chloroform. Membrane permeabilities were determined by monitoring Co and Ni concentration using AAS (Shimadzu AA-6701GF spectrophotometer) in the feed and stripping phase as a function of time. Permeation coefficient (P) and initial mass fluxes (J₀) were calculated from obtained extraction data.

References