

Separation of the Heavy Metals by Macrocyclesmediated Emulsion Liquid Membrane Systems

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정 오 진

조선대학교 환경학과

Result of this study indicate that two criteria must be met in order to have effective macrocycle-mediated transport in these emulsion system.

First, one must effective extraction of the post transition metals, Cd^{2+} , Pb^{2+} and Hg^{2+} , into toluene membrane. The effectiveness of this extraction is greatest if log K values for the metal-macro cycle interaction is large.

Second, the ratio of the log K volues for the metalion - receiving phase to the metal ion-macrocycle interaction must be large enough to ensure quantitative stripping of the metal in at the toluene phaseinterface. Control of the first step can be obtained by appropriate selection of macrocycle donor atom , substituents , and cavity radius. The second step can be controlled by selecting the proper complexing agent for inclusion in the receiving phase. The order of the transport , when using the several A^- species such as SCN^- , I^- , Br^- , and Cl^- is the order of the changing degree of solvation for A^- and the transport of the metals is also affected by the control of concentration for receiving species because of solubility differences.

In this study , we can seperate each single metal ion from the mixture of Cd^{2+} , Pb^{2+} , and Hg^{2+} ions by using the toluene membranes controlledby optimized conditions. Transport of the single metal is also very good , and alkaline and alkaline earth metals as interferences ions did not affect the seperation of the metal in this macrocycle-liquid membrances but transition metal ions were partially affected asinterferences for the post transition metal ions.