

Development of Recovery Process of Boron by Adsorption and Solvent Extraction Techniques

Michiaki Matsumoto
Department of Chemical Engineering and Materials Science,
Faculty of Engineering, Doshisha University

Summary

Boron with a high concentration is involved in the wastewater from a boron mine and from desulfurizing equipment in steam power stations with coal. It is known that boron has the beneficial and toxic effects to growing plants. Therefore, it must be reduced to a low level permitted. Solvent extraction and liquid surfactant membrane techniques have become attractive as a recovery process because it can treat large quantities of wastewater easily. In the present study, we have studied the feasibility of the solvent extraction of boron and liquid surfactant membrane method as a recovery process for boron from the wastewater. First, the extraction system for boric acid was studied using aliphatic diol extractants in the view of practical use. 2-Butyl-2-ethyl-1,3-propanediol (BEPD) as an extractant and 2-ethylhexanol as a diluent was selected as an optimum extraction system from the view-points of both extraction power and distribution of extractant into the aqueous solution. Boron in the organic solution was completely stripped by a sodium hydroxide solution. The extraction of boric acid from the wastewater by the solvent extraction and the liquid surfactant membrane was carried out using the optimum extraction system. In the liquid surfactant membrane process, almost complete extraction was accomplished.