

Treatment of uranium leach solution by electro dialysis for anion impurities removal

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Received 25 August 1995; accepted 3 March 1996

Abstract

The purpose of this paper is to determine whether electro dialysis (ED) is suitable for removing molybdenum, carbonate and bicarbonate ions from leach solutions containing uranium. Four different anion exchange membranes were used for the operation: AMV Selemion, A229 Morgane, RAI 5035 and AR 204 UZL 412 Ionics. The results obtained can be considered as providing a basis for developing an electro dialysis process of separation between uranium and molybdenum.

1. Introduction

Uranium ores can be treated by carbonate leaching. The hexavalent uranium ion is present as $[\text{UO}_2(\text{CO}_3)_3]^{4-}$ [1]. The kinetics and the equilibrium of the chemical reactions are temperature and pressure dependent. In many cases, uranium ores contain some molybdenum. Before the uranium treatment, the mother solutions must, imperatively, be molybdenum free. Fig. 1 shows the flow-sheet of the operation of the hydrometallurgical process. Molybdenum can be eliminated either at level A (Fig. 1), where the leaching solution contains this element in the presence of uranium, carbonate, bicarbonate and the other dissolved elements in the medium, or at level B, just after the precipitation of a part of the uranium due to the addition of sodium hydroxide. At this later stage, the solution contains molybdenum, carbonate, hydroxide anions and a small amount of uranium.

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