

Influence of the co-ions on the transport of sulfate through anion exchange membranes

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Abstract

The increasing demand for clean industrial processes has intensified the use of electrodialysis (ED) in the treatment of metal containing effluents from plating processes. Nickel rinsewater is a multicomponent solution that can be treated by ED in order to recover chemicals and reuse water. The investigation of the different phenomena involved in the transport of anions through anion-exchange membranes in this wastewater has been performed in different synthetic solutions by chronopotentiometry. Parameters like the limiting current density (i_{lim}), the plateau length (ΔU_m), the resistance of the ohmic region (R_{ohm}) and the resistance of the overlimiting region (R_3) were also determined. Even though an anion exchange membrane (AEM), the limiting current density was affected by the proton leakage phenomena, indicated that the proton H^+ has a greater effect than the other co-ions (Ni^{2+} , Mg^{2+} and Na^+). Ohmic resistances were reduced and plateau lengths were increased in the presence of protons. For salts solutions (without acid) the highest diffusion coefficients and lowest co-ion hydrated radii gave the highest plateau lengths and i_{lim} , but the lowest R_{ohm} .

Keywords: Anion-exchange membrane. Sulfate anion transport. Proton leakage. Co-ion effect

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