

## Use of ion-exchange membranes for the removal of tin from spent activating solutions

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Received 26 July 2008; Accepted 25 February 2009

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### ABSTRACT

Transport properties of tin ions through ion-exchange membranes were investigated by chronopotentiometry. Since this specie may form positively and negatively charged complex species, the present work evaluates the transport properties of tin through cation- and anion-exchange membranes. The chronopotentiometry, where a membrane potential response to an applied current density is measured, is a powerful characterization method to obtain information regarding the membrane heterogeneity, transport number of the ions through the membranes and limiting current density. Experiments developed with Sn(II) and Sn(IV) demonstrated that characteristic transition times were obtained for both cationic and anionic membranes and for a wide range of applied currents. The transition time corresponds to the moment where the interfacial salt concentration becomes zero, and it decreases as the applied current increases. A study of different NaCl concentrations revealed that chloride ions were the only species capable of crossing the anion exchange membrane for both Sn(II) and Sn(IV) species. The behaviour of the cationic-exchange membrane was more complex and could be explained in terms of the different complex species formed between tin and chloride, and of the possible hydroxylated tin species present in the proximities of the membrane.

*Keywords:* Wastewater; Tin; Ion-exchange membrane; Chronopotentiometry

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