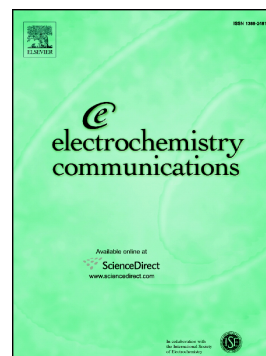


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Electrodeposition of rhenium with suppressed hydrogen evolution from water-in-salt electrolyte

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Abstract

The electrodeposition of rhenium was studied using a “water-in-salt” type of electrolyte with a superhigh concentration of lithium chloride supporting salt to suppress the proton activity. Cyclic voltammetry and DC plating were carried out on rotating disc electrodes to characterize the electrolyte and to prepare thin films. Electrolytes without metal cations were also studied, where the cathodic reduction of proton was significantly suppressed when the concentration of supporting salt approached the solubility limit. Film cracks were eliminated for rhenium films deposited from this superhigh ionic strength electrolyte.

Keywords

salt-in-water, lithium chloride, rhenium, electrodeposition

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1. Introduction

Electroplatable superconductors with a transition temperature above the liquid helium melting point, 4.2 K, make superconductive materials easily accessible for low temperature electronic applications such as modern quantum detectors and computers. While the

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