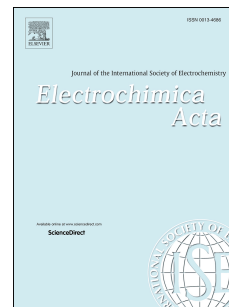


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Experimental characterization of inhomogeneity in current density and temperature distribution along a single-channel PEM water electrolysis cell

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Abstract

Within this contribution an experimental analysis of a 50 cm long single-channel polymer electrolyte membrane water electrolysis cell is presented. The current density and the temperature distribution along the channel coordinate is measured with a printed circuit board setup that enables a very fine resolution of 252 independent measurement segments. After first cell testings in a steady state mode, effects of changed amounts of feed water flux on the cell voltage, the distribution of current density and the temperature profile were investigated. Although the water feed did not significantly influence the current density distribution over a wide range of water fluxes, very low water fluxes lead to a massive drop in the current density **in the rear part** of the active area and a moderate increase at the inlet. This growing heterogeneity influenced **the** temperature distribution as well as the cell voltage.

Keywords: Single-channel cell, Current density distribution, Water flux reduction, Temperature distribution, Scale-Up, PEM water electrolysis

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