

Author's Accepted Manuscript

Electrocatalysts by Atomic Layer Deposition for Fuel Cell Applications

Niancai Cheng, Yuyan Shao, Jun Liu, Xueliang Sun



PII: S2211-2855(16)00027-6
DOI: <http://dx.doi.org/10.1016/j.nanoen.2016.01.016>
Reference: NANOEN1103

To appear in: *Nano Energy*

Received date: 6 November 2015
Revised date: 12 January 2016
Accepted date: 18 January 2016

Cite this article as: Niancai Cheng, Yuyan Shao, Jun Liu and Xueliang Sun
Electrocatalysts by Atomic Layer Deposition for Fuel Cell Applications, *Nano Energy*, <http://dx.doi.org/10.1016/j.nanoen.2016.01.016>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Electrocatalysts by Atomic Layer Deposition for Fuel Cell Applications

Niancai Cheng¹, Yuyan Shao², Jun Liu² and Xueliang Sun^{1}*

¹Department of Mechanical and Materials Engineering, University of Western Ontario, London, ON N6A 5B9, Canada

E-mail: xsun@eng.uwo.ca (X. Sun)

² Pacific Northwest National Laboratory, Richland, WA 99352, USA

Abstract

Fuel cells are a promising technology solution for reliable and clean energy because they offer high energy conversion efficiency and low emission of pollutants. However, high cost and insufficient durability are considerable challenges for widespread adoption of proton exchange membrane fuel cells (PEMFCs) in practical applications. Current PEMFCs catalysts have been identified as major contributors to both the high cost and limited durability. Atomic layer deposition (ALD) is emerging as a powerful technique for solving these problems due to its exclusive advantages over other methods. In this review, we summarize recent developments of ALD in PEMFCs with a focus on design of materials for improved catalyst activity and durability. New research directions and future trends have also been discussed.

Keywords: Atomic layer deposition, Fuel cells, Electrocatalysts, Nanomaterials, Catalyst design

Introduction

Polymer electrolyte membrane fuel cells (PEMFCs), which can efficiently convert chemical energy into electricity through electrochemical reactions, are considered promising alternative power sources for transportation and portable applications due to their high efficiency, low temperature operation, and zero emissions.[1] Recently, Toyota announced the production of a commercial fuel cell car (four-door family sedan, called Mirai) which entered Japanese markets at the end of 2014 and North American and European markets in mid-2015.[2] Toyota is not

Download English Version:

<https://daneshyari.com/en/article/5452562>

Download Persian Version:

<https://daneshyari.com/article/5452562>

[Daneshyari.com](https://daneshyari.com)