Operando investigation of Au-MnOx thin films with improved activity for the oxygen evolution reaction

The electrochemical splitting of water holds great potential as a method for producing clean fuels by storing electricity from intermittent energy sources. The efficiency of such a process would be greatly facilitated by incorporating more active catalysts based on abundant materials for the oxygen evolution reaction. Manganese oxides are promising as catalysts for this reaction. Recent reports show that their activity can be drastically enhanced when modified with gold. Herein, we investigate highly active mixed Au-MnOx thin films for the oxygen evolution reaction, which exhibit more than five times improvement over pure MnOx. These films are characterized with operando X-ray Absorption Spectroscopy, which reveal that Mn assumes a higher oxidation state under reaction conditions when Au is present. The magnitude of the enhancement is correlated to the size of the Au domains, where larger domains are the more beneficial.

General information
Publication status: Published
Organisations: Department of Physics, Experimental Surface and Nanomaterials Physics, Stanford University, SLAC National Accelerator Laboratory
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Number of pages: 7
Pages: 22-28
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Electrochimica Acta
Volume: 230
ISSN (Print): 0013-4686
Ratings:
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 5.01 SJR 1.439 SNIP 1.101
Web of Science (2017): Impact factor 5.116
Web of Science (2017): Indexed yes
Original language: English
Keywords: Water oxidation, Electrocatalysis, X-ray Absorption Spectroscopy, Operando study
Electronic versions:
1349284.pdf. Embargo ended: 20/01/2019
DOIs:
10.1016/j.electacta.2017.01.085
Source: FindIt
Source-ID: 2351410622
Research output: Contribution to journal › Journal article – Annual report year: 2017 › Research › peer-review