

Accepted Manuscript

Title: Integration of electrochemical and synchrotron-based X-ray techniques for *in-situ* investigation of aluminum anodization

Authors: Fan Zhang, Jonas Evertsson, Florian Bertram, Lisa Rullik, Francesco Carla, Marie Långberg, Edvin Lundgren, Jinshan Pan



PII: S0013-4686(17)30937-4
DOI: <http://dx.doi.org/doi:10.1016/j.electacta.2017.04.154>
Reference: EA 29412

To appear in: *Electrochimica Acta*

Received date: 9-3-2017
Revised date: 27-4-2017
Accepted date: 28-4-2017

Please cite this article as: Fan Zhang, Jonas Evertsson, Florian Bertram, Lisa Rullik, Francesco Carla, Marie Långberg, Edvin Lundgren, Jinshan Pan, Integration of electrochemical and synchrotron-based X-ray techniques for *in-situ* investigation of aluminum anodization, *Electrochimica Acta* <http://dx.doi.org/10.1016/j.electacta.2017.04.154>

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 proof before it is published in its final 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.

Integration of Electrochemical and Synchrotron-based X-ray Techniques for *In-situ* Investigation of Aluminum Anodization

Fan Zhang¹, Jonas Evertsson², Florian Bertram³, Lisa Rullik², Francesco Carla⁴, Marie
Långberg¹, Edvin Lundgren², Jinshan Pan^{1,*}

^{1.} *Division of Surface and Corrosion Science, School of Chemical Science and Engineering,
KTH Royal Institute of Technology, Drottning Kristinas väg 51, 10044 Stockholm, Sweden*

^{2.} *Division of Synchrotron Radiation Research, Lund University, Box 118, 221 00 Lund,
Sweden*

^{3.} *DESY Photon Science, Notkestrasse 85, 22607 Hamburg, Germany*

^{4.} *ESRF, B.P. 220, 38043 Grenoble, France*

** Corresponding author: Jinshan Pan*

Abstract

Anodization of aluminum alloys AA 6082 and AA 7075 was investigated *in-situ* with integrated electrochemical and synchrotron-based X-ray reflectivity (XRR) methods providing complementary information about the anodic processes taking place on the alloys. The stepwise potentiostatic polarization measurements reveal dynamic processes of the anodic oxide formation and dissolution, and the following electrochemical impedance spectroscopy measurements detect the break of the native oxide and the growth of typical two-layer anodic oxide film, while the XRR measurements show the growth of entire anodic oxide film whose thickness increases linearly with the increasing applied potential. The results indicate that while a stable anodic oxide can be formed on the both alloys with a similar growth factor, AA 7075 shows a thinner thickness of the barrier layer and a lower resistance of the oxide film. The electrochemical results

Download English Version:

<https://daneshyari.com/en/article/4767019>

Download Persian Version:

<https://daneshyari.com/article/4767019>

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