
Pits and Pores 4: New Materials and Applications – In Memory of Ulrich Gösele

Editors:

D. Lockwood

National Research Council Canada
Ottawa, Ontario, Canada

R. Boukherroub

Université Lille1
Villeneuve d'Ascq, France

Y. Ogata

Kyoto University
Kyoto, Japan

P. Schmuki

University of Erlangen-Nuremberg
Erlangen, Germany

Sponsoring Divisions:



Corrosion



Luminescence and Display Materials



Published by
The Electrochemical Society

65 South Main Street, Building D
Pennington, NJ 08534-2839, USA

tel 609 737 1902

fax 609 737 2743

www.electrochem.org

ecsttransactions™

Vol. 33, No. 16

Copyright 2011 by The Electrochemical Society.
All rights reserved.

This book has been registered with Copyright Clearance Center.
For further information, please contact the Copyright Clearance Center,
Salem, Massachusetts.

Published by:

The Electrochemical Society
65 South Main Street
Pennington, New Jersey 08534-2839, USA

Telephone 609.737.1902
Fax 609.737.2743
e-mail: ecs@electrochem.org
Web: www.electrochem.org

ISSN 1938-6737 (online)
ISSN 1938-5862 (print)
ISSN 2151-2051 (cd-rom)

ISBN 978-1-56677-872-5 (PDF)
ISBN 978-1-60768-222-6 (Softcover)

Printed in the United States of America.

ECS Transactions, Volume 33, Issue 16

Pits and Pores 4: New Materials and Applications - In Memory of Ulrich Gösele

Table of Contents

<i>Preface</i>	<i>iii</i>
----------------	------------

**Chapter 1
Semiconductor Dissolution and Characterization**

(Invited) Remembering Ulrich Gösele <i>H. Föll</i>	3
---	---

Silicon Nanowire Arrays Combining Nanosphere Lithography and Metal-Assisted Etching <i>C. Lévy-Clément, X. Wang, and P. Pittet</i>	15
---	----

(Invited) Rational Design of Etchants for Electroless Porous Silicon Formation <i>K. W. Kolasinski and J. W. Gogola</i>	23
--	----

Ellipsometry, Reflectometry, and XPS Comparative Studies of Oxidation Effects on Graded Porous Silicon Antireflection Coatings <i>J. H. Selj, A. Thøgersen, and E. Stensrud Marstein</i>	29
--	----

A Correlation between the Kinetics and Thermodynamics for the Photo-Electrochemical Etching of N-Si in 2MHF-Ethanolic Solutions <i>W. Jehng and J. Lin</i>	39
--	----

**Chapter 2
Oxide Formation**

(Invited) Localized Breakdown of the Natural Oxide Film on Aluminum by Chloride Ions and the Formation of Oxide Blisters <i>E. McCafferty and P. M. Natishan</i>	47
--	----

Area Selective Formation of Porous Type Aluminum Anodic Oxide Film by a Solution Flow-Type Micro Droplet Cell <i>T. Murata, Y. Goto, M. Sakairi, K. Fushimi, and T. Kikuchi</i>	57
---	----

Chapter 3 Self-Organization and Applications

- Nanoimprinting Process Using Highly Ordered Anodic Porous Alumina 67
T. Yanagishita, K. Nishio, and H. Masuda

Chapter 4 Electrodeposition and Pore Filling

- Direct Electropolymerization of Copolymer Electrolyte into 3D Nano-Architected Electrodes for High-Performance Hybrid Li-ion Macrobatteries 77
N. Kyeremateng, F. Dumur, P. Knauth, and T. Djenizian
- Pt Filling within Mesoporous Silicon by Electrodeposition 87
K. Fukami, D. Shiojima, T. Sakka, and Y. Ogata
- A Porous Silicon/Iron Oxide Nanocomposite with Superparamagnetic and Ferromagnetic Behavior 95
P. Granitzer, K. Rumpf, M. Venkatesan, L. Cabrera, A. Roca, M. Morales, P. Poelt, and M. Albu
- Electrodeposited Metallic Nanowires as a Scanning Probe Tip 101
M. Motoyama and F. Prinz
- Nano-Branched Gold Deposits Prepared by Electrochemical Deposition Using Porous Silicon 109
R. Miyagawa, K. Fukami, M. Chourou, T. Sakka, and Y. Ogata
- Gold Electrodeposition into Mesoporous Silicon: The Effect of Solution Composition 117
M. Chourou, K. Fukami, R. Miyagawa, T. Sakka, and Y. Ogata

Chapter 5 Semiconductor Nanostructures: Formation and Applications

- Nanopore Morphology Development during Current Oscillations at the Si/Electrolyte Contact 127
J. Grzanna, T. Notz, T. Stempel, and H. J. Lewerenz

Porous Silicon as a Nanostructured Template for Enhanced Immobilization and Crystallization of Inorganic and Biomaterials <i>S. Stolyarova and Y. Nemirovsky</i>	137
Optical Properties of Germanium Dots Self-Assembled on Porous TiO ₂ Templates <i>D. J. Lockwood, N. Rowell, I. Berbezier, G. Amiard, L. Favre, A. Ronda, M. Faustini, and D. Grosso</i>	147
Nanostructure Directed Gas-Surface Physisorption Based on Selective Modification of Nanopore Coated Micropores <i>J. L. Gole and S. Ozdemir</i>	167
Pd Assisted HF Etching of Si: Electrochemical Measurement <i>M. Tashiro, S. Yae, Y. Morii, N. Fukumuro, and H. Matsuda</i>	173
Thin Porous Silicon Films Displaying a Near-Surface Dip in Porosity <i>J. H. Selj, A. Thøgersen, P. Bergstrom, S. Foss, and E. Stensrud Marstein</i>	181

Chapter 6 **Nanocomposite Materials and Applications**

Production and Investigation of Porous Si-Ge Structures for Thermoelectric Application <i>A. Cojocaru, J. Carstensen, J. de Boor, D. Kim, V. Schmidt, and H. Föll</i>	193
Nanotubes Consisting of Ni-Particles Covering the Walls of Porous Silicon <i>K. Rumpf, P. Granitzer, P. Poelt, M. Abu, K. Ali, and M. Reissner</i>	203
Photoelectrical Properties of a-Si:H Thin Films Deposited on Porous Silicon by DC-Magnetron Sputtering <i>F. Hamadache, L. Zougar, K. Mokeddem, A. Brightet, and B. Gelloz</i>	209
Corrosion Inhibition of 304 Stainless Steel, Copper and Nickel Metals Using Mesoporous Silicate (MCM- 41) and 2, 5-Distyrylpyrazine Photopolymer <i>M. Zakaria, M. Elmorsi, and E. M. Ebied</i>	227
Author Index	245