
Processes at the Semiconductor-Solution Interface 4

Editors:

C. O'Dwyer

University of Limerick
Limerick, Ireland

A. Etcheberry

Institut Lavoisier de Versailles
Versailles Cedex, France

Sponsoring Divisions:



Electronics and Photonics



Energy Technology



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

ecstransactions™

Vol. 35, No. 8

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 978-1-56677-869-5 (PDF)
ISBN 978-1-60768-219-6 (Softcover)

Printed in the United States of America.

Table of Contents

Preface *iii*

Chapter 1 **Contributions by 2011 ECS Awardees**

(Research Award of the Energy and Technology Division) 3
(Photo)Electrochemistry in the Service of Solar Energy Conversion
C. Lévy-Clément

(European Section Heinz Gerischer Award Presentation) 11
Some Major Electrochemical Challenges Towards a Sustainable Energy Future
H. Tributsch

Chapter 2 **Porous Semiconductors**

(Invited) Electrochemical Formation of Nanoporosity in n-InP Anodes in KOH 29
D. Buckley, C. O'Dwyer, R. Lynch, and N. Quill

(Invited) Modeling Some "Meta" Aspects of Pore Growth in Semiconductors 49
H. Föll, M. Leisner, and J. Carstensen

Fundamentals of III-V Semiconductor Electrochemistry and Wet Etching 61
Processes: Br₂ Etching Properties onto InP
A. Causier, I. Gérard, M. Bouttemy, P. Tran-Van, and A. Etcheberry

Porous InP as Piezoelectric Component in Magneto-Electric Composite 67
Sensors
*M. Gerngross, V. Sprincean, M. Leisner, J. Carstensen, H. Föll,
and I. Tiginyanu*

Raman Scattering Spectroscopy of Metal-Assisted Chemically Etched Rough 73
Si Nanowires
C. Glynn, O. Lotty, W. McSweeney, J. D. Holmes, and C. O'Dwyer

Chapter 3

Semiconductor Surfaces

(Invited) Functionalization of Germanium Nanowires <i>G. Collins, P. Fleming, C. O'Dwyer, M. Morris, and J. D. Holmes</i>	89
(Invited) Functionalization and Behavior in Aqueous Media of Silicon Surfaces for Improved Biochemical Sensing <i>J. Chazalviel, P. Allongue, A. Gouget-Laemmel, C. Henry de Villeneuve, A. Moraillon, and F. Ozanam</i>	101
In-Situ Electrochemical Comparisons between GaAs and InP Regarding a Promising Anodic Process in Liquid Ammonia <i>A. Goncalves, C. Mathieu, O. Seitz, N. Mezaillies, and A. Etcheberry</i>	109
Electroless Oxidation of Diamond Surfaces: Relevance of Concepts Developed for Classical SC Electrochemistry <i>G. Charrier, J. Vigneron, A. Etcheberry, and N. Simon</i>	115

Chapter 4

Semiconductors for Energy Conversion

(Invited) Recent Advances in Electrodeposition of Interfacial Buffer Layers in Chalcopyrite-Based Solar Cells <i>E. Chassaing, N. Naghavi, G. Rocha, V. Bockelee, E. Leite, M. Bouttemy, J. Vigneron, A. Etcheberry, and D. Lincot</i>	127
Electrochemical and Chemical Behavior of InSb Surfaces <i>D. Aureau, R. Chaghi, and A. Etcheberry</i>	135
Electrochemical Passivation of Homoepitaxial InP (100) Thin Films for Light Induced Hydrogen Evolution: A Synchrotron Radiation Photoelectron Spectroscopy Study <i>A. G. Muñoz, C. Heine, H. W. Klemm, T. Hannappel, N. Szabo, and H. Lewerenz</i>	141

Chapter 5

Electrochemical Deposition, Interfaces, and Energy Conversion Materials

Dye-Sensitized Hole Injection at p-type III-V Electrode Interfaces <i>M. Price and S. Maldonado</i>	153
--	-----

Controlled Formation of ZnO Fine-Pattern Transparent Electrodes by Wet-Chemical Etching <i>N. Yamamoto, H. Makino, Y. Sato, and T. Yamamoto</i>	165
Study of Cu Bimetallic Corrosion in CMP Chemical Environments Using Optical Scanning and Micropattern Corrosion Screening <i>K. Yu, N. Thomas, S. S. Venkataraman, K. S. Pillai, T. Hurd, K. Boggs, and O. Chyan</i>	173
Microwave Electrochemical Characterization of the Si/Isolator Interface <i>E. Martinez Moreno and M. Kunst</i>	185
Influence of Residual Ions and Gases at Si/SiO ₂ Interface in Ultra-Thin Gate Oxide <i>T. Chen, H. Lu, and J. Hwu</i>	201
Electromigration Characteristics for Electron Down-Flow in Copper Interconnects <i>Y. Cheng, W. Chang, and Y. Wang</i>	211
Author Index	223