

The Electrochemical Society

# Nanotechnology - General

at the 214<sup>th</sup> ECS Meeting/PRiME 2008

ECS Transactions Volume 16 No.25

October 12-17, 2008  
Honolulu, Hawaii, USA

Printed from e-media with permission by:

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571  
[www.proceedings.com](http://www.proceedings.com)

ISBN: 978-1-61567-299-8

Some format issues inherent in the e-media version may also appear in this print version.

---

Copyright 2009 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](mailto:ecs@electrochem.org)  
Web: [www.electrochem.org](http://www.electrochem.org)

ISSN 1938-6737 (online)  
ISSN 1938-5862 (print)

Printed in the United States of America.

---

## Table of Contents

*Preface*

### Chapter 1 Photocatalysis and Solar Cells

|                                                                                                                                                                                                                                          |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Fabrication of Size-controllable Flower-like TiO <sub>2</sub> and its Photocatalytic Activity<br><i>J. Jitputti, S. Pavasupree, Y. Suzuki and S. Yoshikawa</i>                                                                           | 3  |
| Hybrid Bulk Heterojunction Solar Cells with Anatase Titanium Dioxide Nanotube Arrays from Liquid Phase Deposition by Using ZnO Template<br><i>T. Rattanaavoravipa, T. Sagawa and S. Yoshikawa</i>                                        | 11 |
| Silicon Nanostructures or Photocatalytic and Photovoltaic Application by Chronoamperometric Conditioning<br><i>M. Lublow and H. J. Lewerenz</i>                                                                                          | 17 |
| Energy-Storable Dye-Sensitized Solar Cells with Tungsten Oxide Charge-Storage Electrode<br><i>Y. Saito, S. Uchida, T. Kubo and H. Segawa</i>                                                                                             | 27 |
| Formation of Self Ordered TiO <sub>2</sub> Nanotubes by Electrochemical Anodization of Titanium in 2-Propanol / NH <sub>4</sub> F<br><i>F. M. Bayoumi Hassan, H. Nanjo, H. Tetsuka, M. Kanakubo, T. Aizawa, M. Nishioka and T. Ebina</i> | 35 |
| Physical and Photocatalytic Properties of TiO <sub>2</sub> Nanostructures Fabricated by Means of Glancing Angle Deposition<br><i>Y. Pihosh, I. Turkevych, J. Ye, M. Goto, A. Kasahara and M. Tosa</i>                                    | 49 |
| Anodic Oxidation of Titanium Nanorods<br><i>I. Turkevych, Y. Pihosh, Z. Wang, K. Hara and M. Kondo</i>                                                                                                                                   | 59 |
| Push-Pull Quinoid Dye for Dye Sensitized Solar Cell<br><i>M. Komatsu, K. Tamaki, J. Nakazaki, S. Uchida, T. Kubo and H. Segawa</i>                                                                                                       | 65 |
| Organic Compound/Metal Oxide Hybrid Thin Film Prepared by the Liquid Phase Deposition Method<br><i>S. Deki, Y. Kodama and M. Mizuhata</i>                                                                                                | 73 |

## Chapter 2 Synthesis of Nanostructured Materials

|                                                                                                                                                                             |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Preparation of Perovskite-Type Oxide Fine-Powder by Polymer Precursor Method<br><i>S. Takase, S. Suzuki, T. Matsumoto and Y. Shimizu</i>                                    | 87  |
| Highly Uniform Aluminum Oxy-hydroxide Nanofiber from Porous Anodic Alumina<br><i>H. Jha, T. Kikuchi, M. Sakairi and H. Takahashi</i>                                        | 91  |
| New Oxygen Reduction Electrocatalysts Based on Oxide Nanosheet Materials<br><i>M. Saito, Y. Akeboshi, N. Ohno, J. Kuwano, H. Shiroishi and Y. Uchimoto</i>                  | 97  |
| Sonoelectrochemical Deposition of Functional Composite Layers<br><i>O. Schneider, S. Martens and C. Argirusis</i>                                                           | 107 |
| Effect of Silicotungstic Acid on Photoelectrochemical Properties of Pulse Electrodeposited Cadmium Selenide Films<br><i>K. R. Murali, C. Manoharan and S. Dhanapandiyam</i> | 119 |
| Effect of Silicotungstic Acid on Properties of Pulse Electrodeposited Zinc Selenide Films<br><i>K. R. Murali, S. Dhanapandiyam and C. Manoharan</i>                         | 125 |
| Preparation of Electrodeposited Pt Nano Patterned Electrode using UV-Nano Imprinting Lithography<br><i>M. Saito, J. Mizuno, H. Nishikubo, H. Fujiwara and T. Homma</i>      | 131 |

## Chapter 3 Nanotechnology for Electronics

|                                                                                                                                                                               |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Ultrasoother Gold as a Top Metal Electrode for Molecular Electronic Devices<br><i>M. Coll, C. Hacker, L. Miller, D. Hines, E. Williams and C. Richter</i>                     | 139 |
| Arrayed Si/SiGe Nanowire Heterostructure Formation via Au-catalyzed Wet Chemical Etching Method<br><i>X. Wang, K. Pey, W. Choi, C. Ho, E. A. Fitzgerald and D. Antoniadis</i> | 147 |
| Assembly of CdSeS(ZnS) Quantum Dots in Langmuir Films with Tertiary Alkyl Phosphine Ligands<br><i>A. J. Giles, J. Pagan, K. Patel and E. B. Stokes</i>                        | 155 |

**Chapter 4**  
**Applications of Nanotechnology**

|                                                                                                                                                                                             |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Luminescent Properties of CdSe Quantum Dots Subjected to MBE GaN Growth Temperatures<br><i>M. D. Hodge, J. Pagan, C. Burkhart, K. Patel and E. B. Stokes</i>                                | 165 |
| Kinetics Study of Ozone Gas Enhanced Passivation of Pure Iron<br><i>H. Nanjo, Y. Suzuki, J. Hayasaka, F. M. Bayoumi Hassan, I. Ishikawa, M. Kanakubo, T. Aizawa, T. Aida and J. Onagawa</i> | 171 |
| Origin of Nanobubble - Formation of Stable Vacancy in Electrolyte Solution<br><i>R. Aogaki, M. Miura and Y. Oshikiri</i>                                                                    | 181 |
| Author Index                                                                                                                                                                                | 191 |