MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS VOLUME 838

Scanning-Probe and Other Novel Microscopies of Local Phenomena in Nanostructured Materials

November 29 – December 3, 2004 Boston, Massachusetts, USA

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 www.proceedings.com

ISBN: 1-55899-786-5

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

CAMBRIDGE UNIVERSITY PRESS Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi, Tokyo, Mexico City

Cambridge University Press 32 Avenue of the Americas, New York, NY 10013-2473, USA

www.cambridge.org

Materials Research Society 506 Keystone Drive, Warrendale, PA 15086 http://www.mrs.org

©Materials Research Society 2026

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2026

CODEN: MRSPDH

ISBN: 3/77:;;/9:8/7

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-part Internet Web sites referred to in this publication and does not guarantee that any content on such Web sites is, or will remain, accurate or appropriate.

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400 Fax: 845-758-2634 Email: curran@proceedings.com Web: www.proceedings.com



TABLE OF CONTENTS

- 1 Biaxial Strain Induced Electrical Inhomogenities and Phase Separation in the Ferromagnetic Metallic Phase in Thin Films of La0.7Ca0.3MnO3: A Scanning Tunneling Potentiometry/Spectroscopy Study Blamire, Mark;Mathur, Neil;Mitra, Joy;Paranjape, Mandar;Raychaudhuri, Arup
- 7 Linear Measurements of Nanomechanical Phenomena Using Small-Amplitude AFM Grimble, Ralph;Hoffmann, Peter;Jeffery, Steve;Matei, George;Oral, Ahmet;Özer, Özgür;Patil, Shivprasad;Pethica, John;Tanulku, Atay
- 13 Atomically Resolved Imaging of Epitaxial CaF2 on Si(111) Using Noncontact Atomic Force Microscope Seino, Yoshihide
- **19** Quantitative Surface Potential Tracking of Organic and Ionic Adsorbates Eng. Lukas
- 25 Micro/Nano Indentation and Micro-FTIR Spectroscopy Study of Weathering of Coated Engineering Thermoplastics Samik Gupta, Jan Lohmeijer1, Savio Sebastian, Nisha Preschilla and Amit Biswas GE India Technology Center, Hoodi Village, Whitefield Road, Bangalore-560066, India IGE Advanced Materials-Europe, Plasticlaan-1, Bergen op Zoom, The Netherlands
- 32 Near Field Optical Scanning Microscopy of Phase Separation Effects in Diluted Nitride Alloys Mintairov, Alexander
- 38 Apertureless Head: A Multipurpose Tool Really Combining Atomic Force Microscopy with Powerful Means for Optical Investigations Baukov, Victor; Gavrilyuk, Vasily; Saunin, Serguey; Zhizhimontov, Vladimir
- 44 A Scanning Tunneling Microscopy Study: Si/SiO2 Interface Roughness Induced by Chemical Etching Liu, Lequn;Lyding, Joseph;Yu, Jixin
- 50 Observation of Micro-Tensile Behavior of Thin Film TiN and Au using ESPI Technique 222
- 56 Direct Observation of Polar Nanostructures in PLZT Ceramics for Electrooptic Applications Kholkin, Andrei; Kisselev, D.; Orlova, A.; Shvartsman, V.; Sternberg, A.

- 62 Optical Near-Field Enhancement Around Lithographic Metallic Nanostructures Using an Azo-Dye Polymer: Direct Observation and **Realization of Sub-Wavelength Complex Structures** Hubert, Christophe
- 68 Radiation Induced Subsurface Charging in the Buried Oxide Layer in SIMOX Mickle, Samantha; Stevens-Kalceff, Marion
- 74 Absolute Measurement of Three-Dimensional Polarization Direction Using Scanning Nonlinear Dielectric Microscopy Cho, Yasuo; Odagawa, Hiroyuki; Sugihara, Tomoyuki
- 80 Local Electromechanical Properties of Ferroelectric Materials for **Piezoelectric Applications** Bdikin, Igor; Bogomolv, A.; Kholkin, Andrei; Kim, S. H.; Kiselev, D.; Orlova, A.; Shvartsman, V.
- 86 Nanoscale Elastic-Property Mapping with Contact-Resonance-Frequency AFM

Hurley, D.; Kos, A.; Rice, P.

- 92 Semiconductor Dopant Profile and Dielectric Characterization with Scanning Capacitance Microscopy Kopanski, Joseph
- 104 Scanning Conductance Microscopy and High Frequency Scanning Gate Microscopy of Carbon Nanotubes and Polyethylene Based Nanofibers Bonnell, Dawn; Johnson, Alan, Jr.; Pinto, Nicholas; Shao, Rui; Staii, Cristian
- 110 STM Image Simulation: Effect of the Number of Tunneling States and the **Isosurface Value** Batina, Nikola; Galván, Marcelo; Radilla, Juan; Trinidad-Reyes, Yolanda
- 116 Atomically Resolved STM Images of CVD Grown Carbon Nanotubes Chiang, Daniel (Ching-Shih); Dong, Lifeng; Jiao, Jun; Lei, Philip (ZiFeng)
- 122 Electrical AFM Measurements for Evaluation of Nitride Erosion in Shallow Trench Isolation Chemical Mechanical Planarization Ruland, Tino; Schwalke, Udo; Stefanov, Yordan
- 128 Electrical Characterization Using Scanning Capacitance Microscopy of the Local Electronic Properties of Ge Semiconductor Nanostructures Bremond, Georges
- 134 Mapping of Local Electronic Properties in Nanostructured CMR Thin Films by Scanning Tunneling Microscopy (STM) and Local Conductance Map (LCMAP)

Brar, Loveleen; Ghosh, Barnali; Kar, Sohini; Paranjape, Mandar; Raychaudhuri, Arup

- 140 Force-Strain Curves Of Microcapsules With Atomic Force Microscopy Lansey, Eli;Zypman, Fredy
- **146** Influence of Tip Wear on Atomic Force Acoustic Microscopy Experiments Geiss, Roy;Hurley, Donna;Kopycinska-Mueller, Malgorzata;Rice, Paul
- **152** Frequency Response of Microcantilevers in Viscous Fluids Schilowitz, Alan; Yablon, Dalia; Zypman, Fredy
- 158 In Situ Monitoring of Dispersion Film Formation Using Tapping Mode Atomic Force Microscopy Chum, Steve;Li, Jing;Liang, Wenbin
- 164 Novel Dynamic Scanning Microscope Probe and Its Application to Local Electrical Measurement in an Ion Sensitive Field Effect Transistor Akiyama, Terunobu
- 170 Ballistic Electron Emission Luminescence of InAs Quantum Dots Embedded in a GaAs/AlxGa1-XAs Heterostructure Appelbaum, Ian;Gossard, Arthur;Hanson, Micah;Narayanamurti, Venkatesh;Russell, Kasey;Yi, Wei
- 176 Improve the Accuracy of Scanning Kelvin Probe Microscopy by Eliminating the Cantilever Effect Spencer, Michael; Yang, Zhitao
- 182 A Near-Field Microwave Probe for Quantitative Characterization of Dielectric Thin Films Ming, Bin;Moreland, Robert;Scherz, Andre;Schwartz, Andrew;Talanov, Vladimir
- **188 Theory of Scanning Probe Microscopy of Carbon Nanostructures** *Kalinin, Sergei;Lambin, Philippe;Meunier, Vincent*
- 200 Development of an Ultra-High Vacuum Scanning Nonlinear Dielectric Microscope and Near Atomic-Scale Observation of Ferroelectric Material Surfaces Cho, Yasuo;Odagawa, Hiroyuki
- 206 Raman and Rayleigh Smart Imaging of Nanophases and Nanosized Materials. Alternatives Techniques to SEM, TEM and AFM? Colomban, Philippe;Havel, Mickaël
- 212 High-Resolution Photochemical Reaction Using Triplet-Sensitizer Probes Mashiko, Shinro; Miki, Hideki; Otomo, Akira
- **218 TEM Investigation of Nucleation and Initial Growth of ZnSe Nanowires** *Cai, Y.; Chan, S.K.; Chan, Y.F.; Sou, I.K.; Su, D.S.; Wang, N.*

- 224 Scanning Probe Recognition Microscopy Investigation of Elastic Properties of Tissue Scaffolding Ayres, Virginia;Chen, Qian;Fan, Yuan;Rice, Alan;Schindler, Melvin;Udpa, Lalita
- 230 Electronic Properties of Modified Surfaces Using Contact and Non-Contact Scanning Probe Microscopy Techniques and SECM Bond, Alan;Neufeld, Aaron;O'Mullane, Anthony
- 236 Effects of Surface Functionality and Humidity on the Adhesion Force and Chemical Contrast Measured with AFM Briggman, Kimberly; Chen, Lijiang; Fasolka, Michael; Gu, Xiaohong; Hwang, Jeeseong; Martin, Jonathan; Nguyen, Tinh
- 242 The M-TA (Scanning Thermal Microscopy) A Tool for Quantitative Surface Analysis and Surface Treatment Fischer, Hartmut